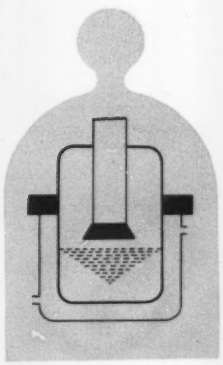
JULY 22, 1957

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



Vacuum Melted Alloys

"An expanding capacity assures designers they can get what they need"—William B. Pierce,
vice president, sales, Allegheny Ludlum Steel Corp.
—page 137

✔ **How To Win Labor Arbitration Cases**
—page 60

✔ **Steel Rule Dies Gaining Acceptance**
—page 100

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STAINLESS STEELS AND CORROSION RESISTANCE

The best stainless steel tubing for a specific application cannot be identified by surface appearance alone. The answer is found in the grain structure because the corrosion resistance of any given grade of stainless steel depends on heat treatment.

And constant testing is the only way to prove a material's ability to beat the many different types of corrosive attack . . . as B&W men like Mike Landman, who checks corrosion resistance of B&W Stainless Tubing, know. And the entire team of B&W technicians—inspectors, furnace operators, metallurgists, engineers and chemists—know that constant checking is an integral part of the complete production cycle.

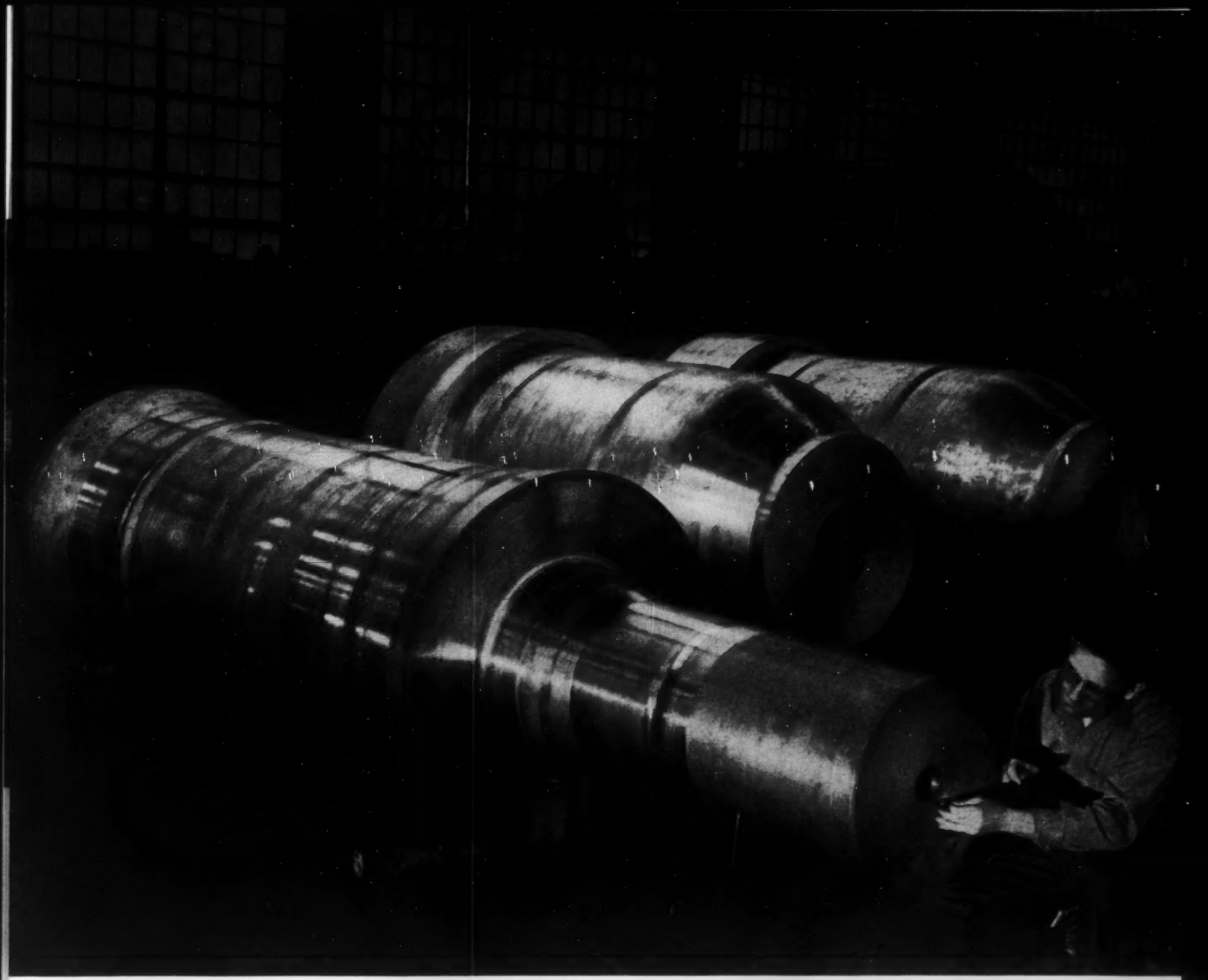
Generations of experience are built into every foot of B&W Stainless Tubing. The end result assures long service life—the most corrosion resistant tubes for your particular process industry application. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

B&W

TUBULAR PRODUCTS DIVISION

TA-7018-G2

Seamless and welded tubular products, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels.



BIG FORGINGS
to help make other forgings

These three forgings have a strong family tie, since they were all made in the Bethlehem shops for use in the same machine. That machine, by the way, is a mechanical monster whose job is to make more forgings. It exerts tremendous pressures, so the components you see in the picture have their work cut out for them.

In the foreground, looking very much like a giant potato-masher, is a pullback cylinder; length, 13 ft 8 in. The OD of the main body ranges from 43 to 46 in. Weight of piece as shown, 26,550 lb.

The twin forgings in the background are intensifier cylinders. Each has a maximum OD of 58 in. and an overall length of 7 ft 11 in. Each weighs 27,640 lb. Thus, though the camera may have fooled you, these pieces are actually somewhat heavier than the pullback cylinder.

You may never require any forgings of quite the same nature. Perhaps your needs run to much smaller items, or to something much larger. In any case, Bethlehem is fully prepared to take care of you. Our shops can meet your specifications on all types of drop, press, and hammer forgings, regardless of size or design. Inquiries always welcomed.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

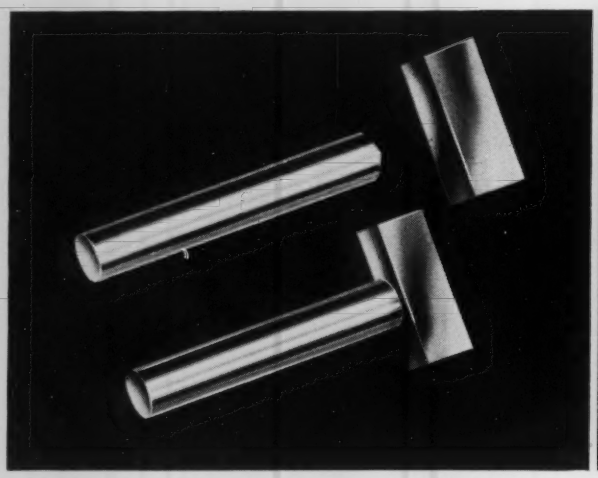
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

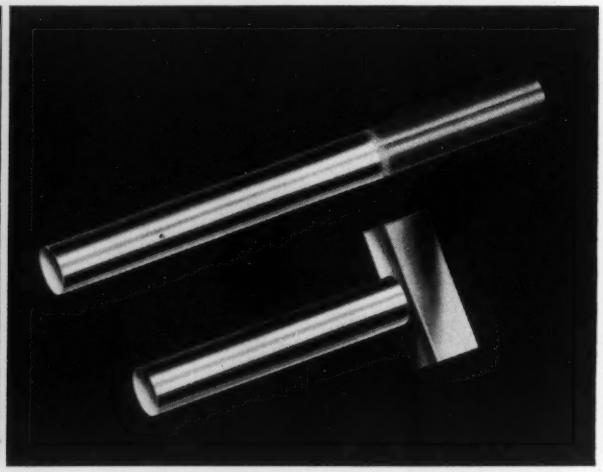
BETHLEHEM STEEL

G.R.S. Cuts Costs 65%

with TOCCO* *Induction Heating*



Old Method — headpieces and shanks were butt-welded after shanks were pointed and both parts sandblasted.



New Method — relay cores are formed from barstock heated by TOCCO Induction Heating. No sandblasting or welding is required.

● When General Railway Signal Company converted from butt-welding to TOCCO Induction Heating to form this relay core, they not only produced a better product, faster—but saved money doing it.

Faster Production — A 75 kw, 10,000 cycle TOCCO unit heats 4⅜″ of this 9⅞″ long, ¾″ diameter silicon steel bar to 2100° F. for upsetting magnetic relay cores. 40 kw of high-frequency energy is used, producing 250 pieces per hour—nearly three times the production achieved by their former method.

Lower Cost — Formerly G.R.S. cut separate shanks and rectangular headpieces for this relay core. The shanks had to be pointed and both pieces sandblasted prior to butt-welding. Heating the blanks for forging with TOCCO saves nearly two-thirds the cost of this former method.

TOCCO is Flexible — The part shown is only one of nearly 300 that G.R.S. is heating for forging with TOCCO. Production runs vary from 15 to over 50,000 pieces.

It may pay *you* to investigate TOCCO as a sound method of improving product quality, increasing production and reducing costs.

TOCCO

JUST PUSH A BUTTON

THE OHIO CRANKSHAFT COMPANY

***Mail Coupon Today*—NEW FREE Bulletin**

The Ohio Crankshaft Co. • Dept: S-7, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Heating for Forming and Forging".

Name_____

Position_____

Company_____

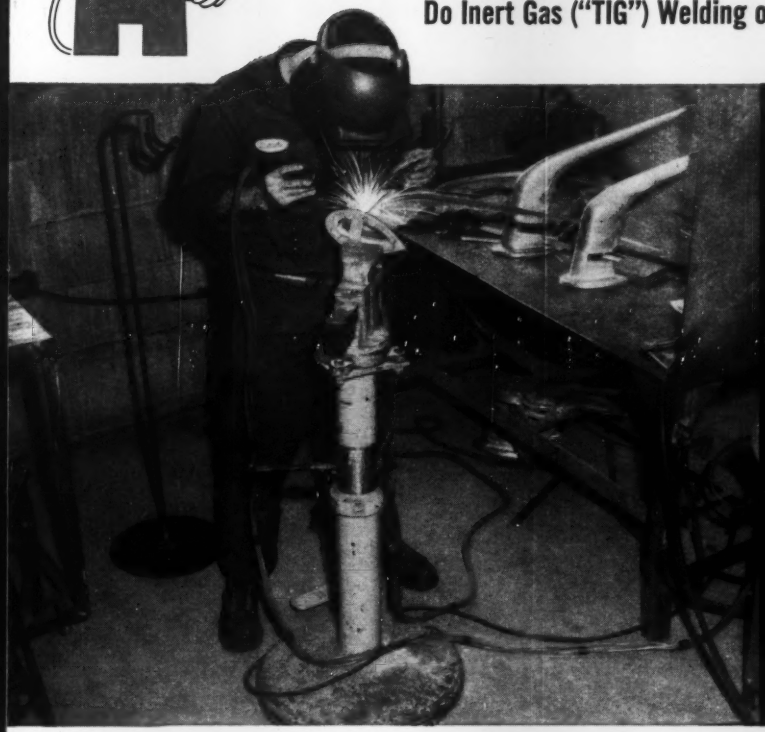
Address_____

City_____ **Zone**____ **State**_____

Here's a Profitable New HOBART...

WELDER COMBINATION

Do Inert Gas ("TIG") Welding or Conventional Metallic Arc Welding, AC or DC



Model ADI-364

Model AD-364

Now you can have your choice of ac welding or dc welding, plus inert gas welding if desired . . . all with remote control! Inert Gas Welding facilities let you weld special and alloy metals as well as regular mild steel. A convenient switch gives a choice of metallic arc welding, tungsten arc welding with continuous high frequency for welding aluminum and similar metals, or tungsten with timed high frequency for welding stainless steel.

With this new Hobart AC/DC unit you can handle jobs that call for either AC or DC (straight or reverse polarity) by merely shifting the convenient selector switch. Versatility is a time saving, money saving feature. And Hobart now gives you another top quality arc welder that is tops in versatility. Write or call today for complete specifications, no obligation.

HOBART BROTHERS CO., Box ST-77, Troy, Ohio, Ph. FE 21223

"One of the world's largest builders of arc welding equipment"

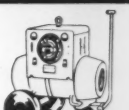
This new AC/DC Welder Combination may also be had without the Inert Gas Facilities if desired. Lets you choose either AC or DC metallic arc welding using the new faster welding electrodes.

For welder without Inert Gas Facilities, ask for details on Model AD-364.

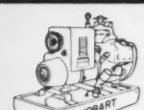
CHOOSE FROM THE MOST MODERN AND MOST COMPLETE LINE OF ARC WELDERS ON THE MARKET TODAY!

HOBART TROY OHIO WELDERS

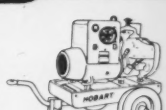
"Contractor's Special" 250 amp., GAS DRIVE



ELECTRIC DRIVE 200 to 600 amp.

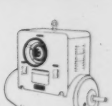


"HUSKY BOY" 200 amp. GAS DRIVE

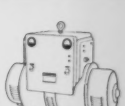


AC WELDER 200 amp. OR AC POWER COMBINATION

GAS ENGINE DRIVE 300 TO 600 amp. SIZES



"BANTAM CHAMP" 250 amp. generator only



CONSTANT VOLTAGE FOR AUTOMATIC WELDING

No. 413 (E-6013)

Hobart's new No. 413 electrode

Fast operating characteristics, wide range of application and a good, penetrating arc make this new electrode easy to use.

The "413" will instantly start and restart, even when partially consumed. For heavy to light gauge mild steels.

TRY THE "413" SOON!

HOBART BROTHERS CO., BOX ST-77, TROY, OHIO

Without obligation, send me complete information on:

_____amp. capacity.

- ☐ AC/DC with Inert Gas
- ☐ AC/DC without Inert Gas
- ☐ Gas Engine Drive
- ☐ "Contractor's Special"
- ☐ Electric Drive
- ☐ "Bantam Champ"
- ☐ "413" electrodes
- ☐ AC Welder—AC Power Combination
- ☐ "Husky Boy"
- ☐ Automatic Welding

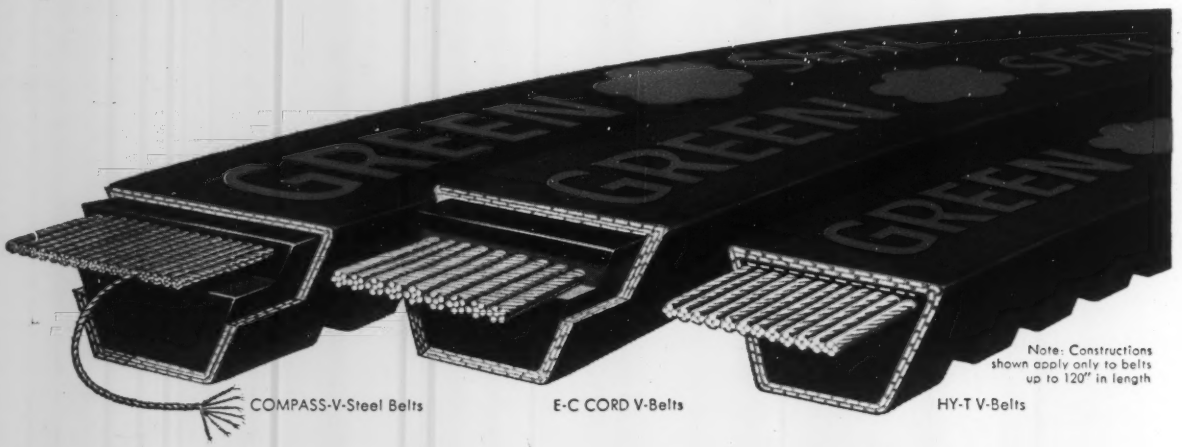
Name_____ Position_____

Firm_____

Address_____

City_____ State_____

Now—V-Belts with the Green Seal solve the major multiple drive problem



The Green Seal stands for true dimensional stability in V-belts. And with Green Seal dimensionally stable belts you can be sure that matched sets are truly matched and will stay matched—that mismatching (the biggest problem in belting multiple drives successfully) is a thing of the past.

The key to dimensional stability lies in the tension members of the belt. For many years, steel cables as developed by Goodyear were the only length stable load carriers, but now they have been joined by synthetic cords, thanks to the amazing Triple-Tempered 3-T process.

The 3-T process is an exclusive method of tempering the cord with Tension, Temperature and Time for maximum strength and minimum change in dimensions. This assures no change in length during storage plus greatly increased shock- and stretch-resistance on the drive.

The end result is smoother, longer-running teams of belts that give you maximum, trouble-free, horsepower hours at minimum cost. What better reason for specifying V-belts with the Green Seal?

DIMENSIONALLY STABLE V-BELTS with the GREEN SEAL by

GOODYEAR

THE GREATEST NAME IN RUBBER

The Goodyear Tire & Rubber Company, Industrial Products Division, Dept. 794, Akron 16, Ohio

Please send me more information about how V-Belts with the Green Seal solve the major problem in belting multiple V-belt drives.

Name_____

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Street Address_____

City_____ **Zone**_____ **State**_____

Compass, E-C Cord, Hy-T, Green Seal—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

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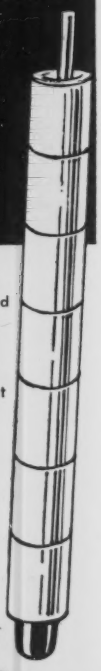
Index available semiannually. STEEL is also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

℞ for Moisture-Hungry Stopper Rod Tile

WALSH MORT-AIRSET

High Temperature Air-Setting Cement Assures High Moisture Retention . . . Guarantees Stronger, Tougher, Tighter Bond For Stopper Rods



Here's a refractory cement that retains it's original moisture content when applied to "moisture-hungry" tile . . . combines smooth workability with non-shrinking qualities to produce remarkably tight impenetrable joints throughout the complete temperature range to 3000° F.

Try this cement for bonding your stopper rod tile. Note for yourself it's excellent working, drying and non-shrinking properties that deliver easier application, better bond and longer service life. Guaranteed not to "gum up" or form lumps in the drum even after extended periods of storage.

Packed in 500 lb. and 200 lb. drums and smaller steel containers.

Write for literature.

Specialists in Refractories of High Bulk Density and Low Porosity

WALSH REFRACTORIES CORPORATION

101 FERRY ST. • ST. LOUIS 7, MO.

FOR OVER 60 YEARS MANUFACTURERS OF HIGH GRADE REFRACTORIES

behind the scenes

Vacuum Melting

Of course it is perfectly ridiculous to consider the creation of the universe and vacuum-melted steel alloys at the same time, but if one is a stickler for the truth (Honest Shrdlu they call us on the coast), one will be obliged to stipulate that in both instances something came from nothing. The book of Genesis is a standard reference in the matter of the first instance, but Associate Managing Editor Vance Bell informed us that in the matter of the second instance, namely vacuum melted steel alloys, little statistical information had been assembled until he assigned himself to the task.

Vacuum melting had been pretty much of a laboratory dodge until nine or ten years ago. Contemporary alchemists, minus robes and whiskers, potted about with vacuum pots and cooked up metals that were almost too clean to use. When titanium came into general use, it had to be melted in the cleanest environment possible, and everybody agreed that it was difficult to find anything cleaner than a vacuum. Makers of fine steels began to use the method to produce slick parts for jet engines, shafts for turbines and other items, and it came to pass that designers and engineers murmured: "Does anybody know who makes vacuum melted steel, and how much, and what it costs, and who buys it, and available capacity and stuff like that?"

Well, all this needful information is gathered together this week in STEEL's lead market story on page 137, and from what we can gather, it's about time, too.

Sales Curves

Mention of Genesis back there a moment ago reminds us that there are indeed but few original ideas in the world. One of the first sales devices, if we can lean on a shaky recollection of Holy Writ, was a smile and a wiggle that sold an apple. According to a press release, the same technique is being utilized today by the McCarty Co., Los Angeles. McCarty sells a slide rule device that concentrates approximately 40 pages of the engineers' handbook; and because it gives all essential dimensions and details required by persons who wish to select screws, nuts, bolts and rivets, it is called the Visidex selector.

The best part of the press release was a picture of a real yummy doll, known as Miss Denmark. Dressed in a fetching Santa Claus cap and a bathing suit that would have worried Saint Anthony, Miss Denmark is pictured selling one of McCarty's devices to an engineer—by George, there *was* another person in that photograph! Coming back to the Danish dish (anybody over 8 and under 80 would be foolish not to), the press release boys said she was qualified to enter the engineering field because she has some curves that will intrigue calculus experts.

Oh, well, maybe we'll get a chance to buy one of those handy slide rules some day, but with our luck we'll purchase it from a 200-lb salesman with a 5 o'clock shadow.

Information Please

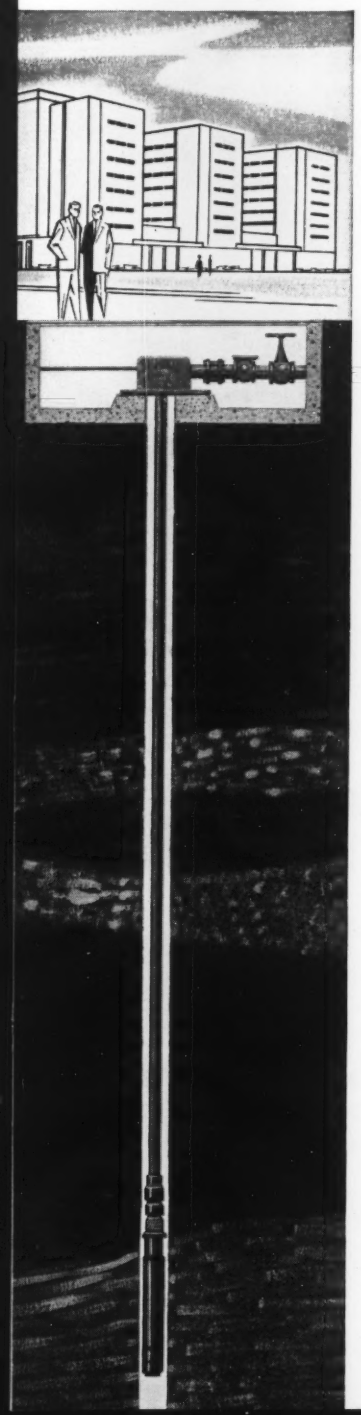
Associate Editor Frank Briggs, who doesn't like to let a day go by without learning something new, was kind enough to let us in on a little secret revealed to him by spokesmen for the International Steel Co., Evansville, Ind. International builds revolving doors, and it has established that the maximum safe speed at which you should go through a revolving door is 12 revolutions per minute. That's a mighty handy piece of information.

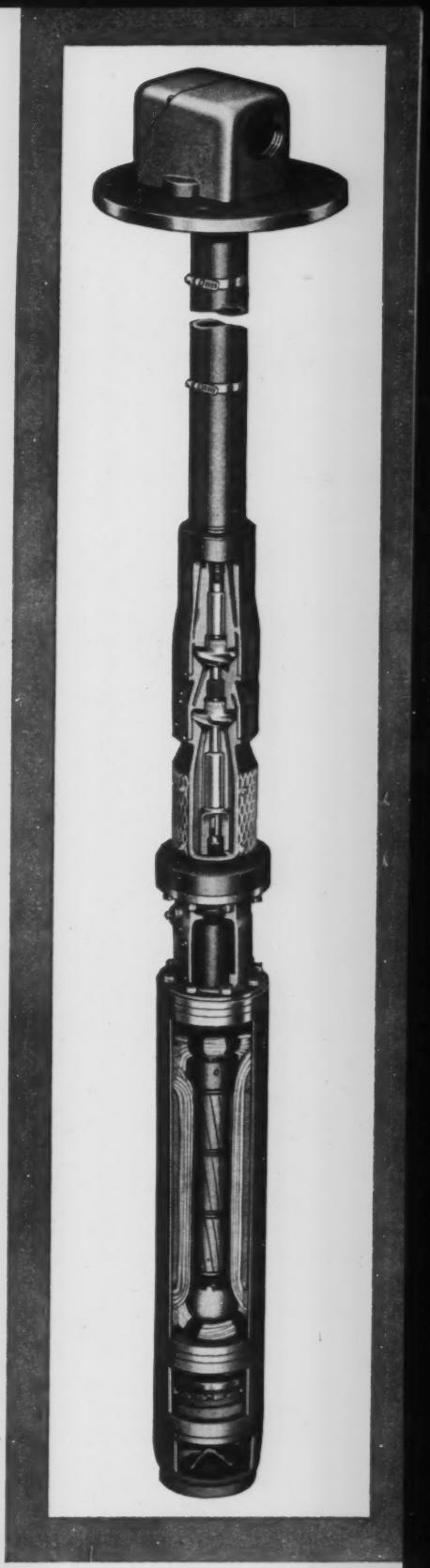
And since we are at the bottom of the page again, we would be remiss in common courtesy if we failed to publicly acknowledge a midmorning snack donated by Associate Editor Byron Kennel. Byron kindly gave us a smoked squid, and you'd be surprised how quiet it has been around here ever since. Persons who came to call seemed to change their minds and hurried by, and—SAY! Maybe they were simply pretending to suffer from hay fever, and they held handkerchiefs to their noses because —Well, anybody want a smoked squid?

Shrdlu

(Metalworking Outlook—Page 51)

Now you can bury your pumping problems





FAIRBANKS-MORSE
Water-Lubricated Submersible Pump

Now you can have all the advantages of a submersible pump, plus time- and performance-tested Fairbanks-Morse features.

Fairbanks-Morse submersible pumps permit well location anywhere that a well can be drilled. No unsightly installations, no costly pump housing. Nothing—absolutely nothing—need show above ground. These pumps submerged in the well below water level are practically soundless and require no line shafts, packing boxes or lubrication devices. Hence, wearing parts needing maintenance are reduced to a minimum. A single moving assembly does all the work.

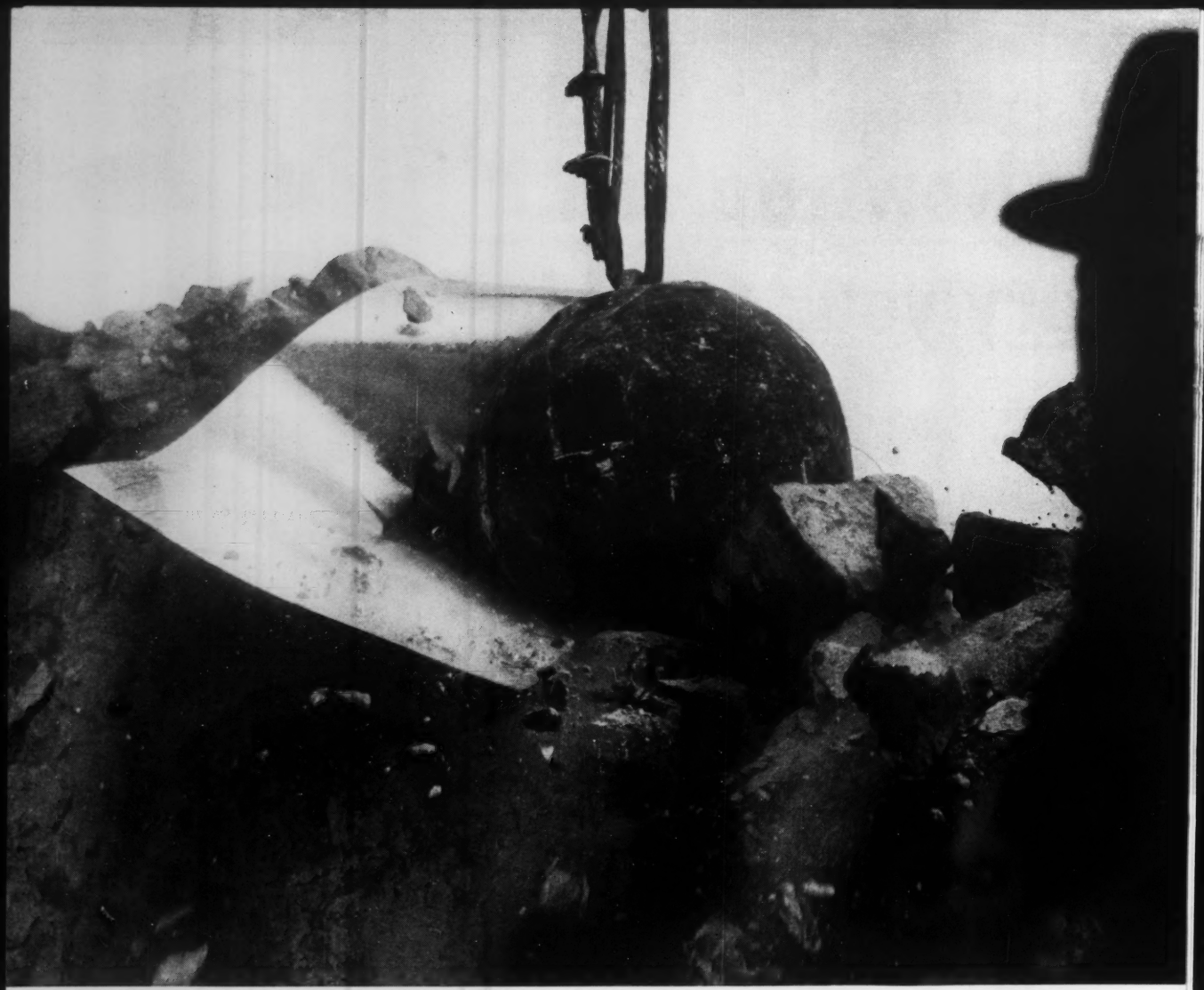
Installation is faster and more economical. The Fairbanks-Morse motor, with lifetime Copperspun rotor cooled by water and lubricated by water, gives full motor output. The well-known Fairbanks-Morse or Pomona pump bowls are combined with these wet stator motors to produce unbeatable pumping units covering a wide range of requirements as to volume, pressure, and setting depth.

For industry or community service you can place your water service trust in the F-M submersible. Contact your Fairbanks-Morse Sales Engineer and ask him for Bulletin 6910 on this time-proved submersible pump, or write today to Fairbanks, Morse & Co., Dept. S-7-22, 600 S. Michigan Avenue, Chicago 5, Illinois.

FAIRBANKS-MORSE

a name worth remembering when you want the BEST

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY
RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS



THEY SMASHED INTO THAT WEIRKOTE® TILL WE COULDN'T STAND IT!

When a half-ton steel wrecking ball smashes broadside on target—mister, that's a *test*.

Yet, when Weirkote zinc-coated steel is put through that, or equally brutal punishment, its zinc coating stays skin-tight throughout the ordeal.

Think of that demonstration in terms of *your* products, production steps and cost problems.

Weirkote's continuous-process zinc coating *thrives* on toughest fabrication steps—spinning, deep drawing, roll forming, extrusion. And there's no flaking or peeling.

With Weirkote, you can eliminate the cost of plating, painting or redipping after fabrication. In many instances, you'll get prolonged die life, too, due to the lubricating quality of Weirkote's zinc coating.

Free Weirkote Booklet

Send for the new booklet on Weirkote today. Write Weirton Steel Company, Dept. B-6, Weirton, West Virginia.

WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

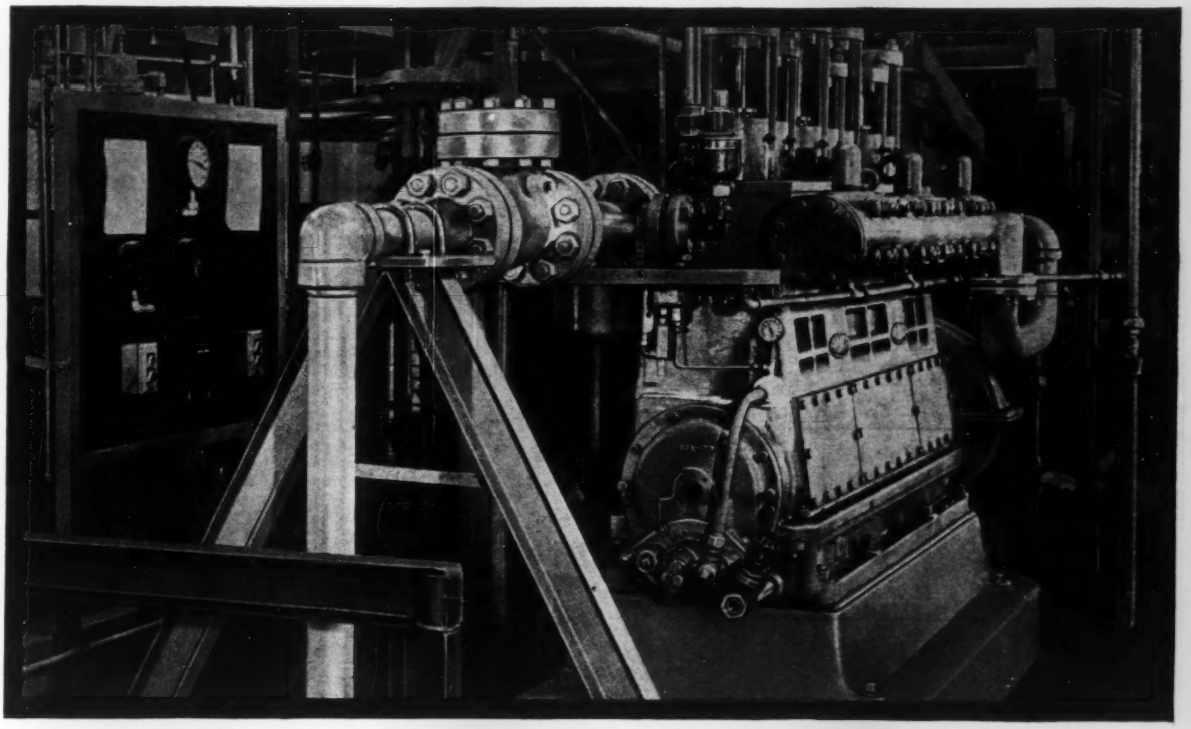
a division of

NATIONAL STEEL CORPORATION

MIDWESTERN DIE CASTER FINDS ANSWER:

How to pump hydraulic fluids non-stop when downtime means loss of production

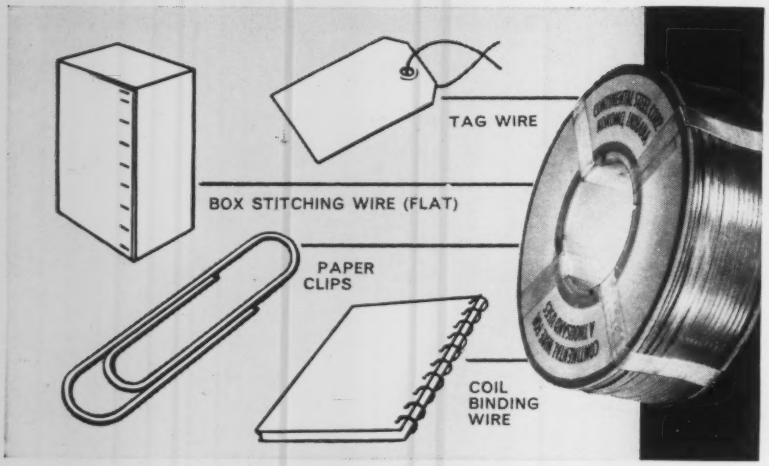
During "rush seasons," when shifts work around the clock, this large midwestern manufacturer must have constant, dependable hydraulic power. One hundred percent capacity can only be maintained when the hydraulic system delivers a steady output pressure with no downtime.



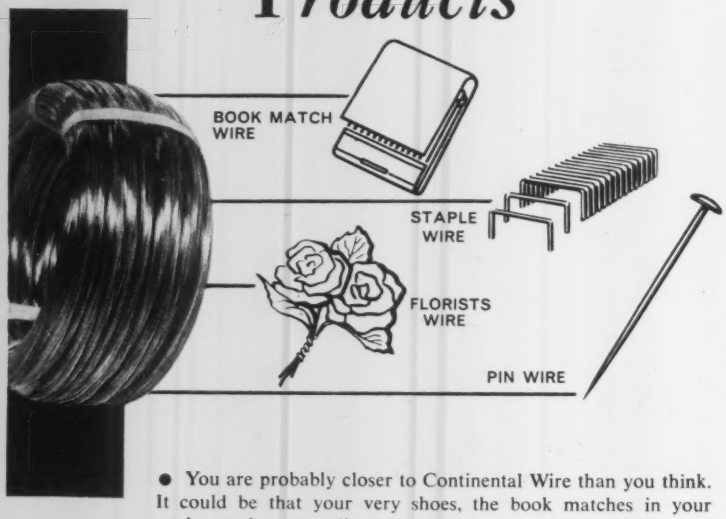
How the problem was solved: Foreseeing 24 hour days, seven days a week, the die caster turned to Aldrich. As new facilities were added, so were Aldrich Pumps. The first, a 250 gpm pump, was installed four years ago. Since then, three more 207 gpm pumps have been added. All are 2 1/4" x 5", 1500 psi, gear driven Aldrich Septuplex Pumps, equipped with 200 hp motors.

Result: Just what you'd expect of an Aldrich Installation—steady dependability for continuous operation—highest reliability for intermittent service. Maintenance is held to a minimum. Operating efficiency has remained constantly high. Get full information on Aldrich Pumps and their advantages. Write the Aldrich Pump Company, 18 Gordon St., Allentown, Pa.

the toughest pumping problems go to ALDRICH



Fine and Specialty Wire for Super Fine Products



● You are probably closer to Continental Wire than you think. It could be that your very shoes, the book matches in your pocket or the paper clips in your desk—were made using dependable Continental Fine Wire! That's because Continental is preferred by hundreds of leading firms for literally thousands of different fine wire applications. For super fine products—you, too, should try Continental Fine and Specialty Wire, available in many sizes, of almost any temper, finish or analysis, in low carbon and medium low carbon steels.

For the finest in fine wire—call in Continental!

CONTINENTAL

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PRODUCERS OF: Manufacturers' Wire in many sizes, tempers, and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, and special shaped wire. Also Welded Wire Reinforcing Fabric, Nails, Continental Chain Link Fence, and other products.

LETTERS
TO THE EDITORS

STEEL Warmly Received

The weekly copy of STEEL is warmly received by this off.ce. We thoroughly enjoy the editorials and find many of the articles to be helpful with our daily tasks.

We found the Welding Electrode Selector (Apr. 1, opposite page 98) to be of particular interest and would appreciate receiving a copy.

Thomas L. Murphy
Engineering Assistant
Shop Operations Engineering
Idaho Test Station
Aircraft Nuclear Propulsion Project
General Electric Co.
Idaho Falls, Idaho

Market Research Can Be Small

Just want to raise a voice of disagreement with the letter entitled "Market Research Problem" in your June 17 issue (page 10).

Our agency has been doing market research since 1935, and doing it effectively. The cost is small compared with the importance of the results.

We have been able to give a company the green light on the development of a completely new machine on the basis of a market study involving no more than three dozen letters.

I think that would qualify for a "small" market investigation, would it not?

Athel F. Denham
Denham & Co.
Detroit

A Question of Aptness

May we gently chide you for an inconsistency?

Being aware of the modern, up-to-date, newsworthy characteristics that distinguish STEEL magazine, we were somewhat puzzled by the cover of your June 10 issue showing the hands of "Labor" wiping with cotton waste.

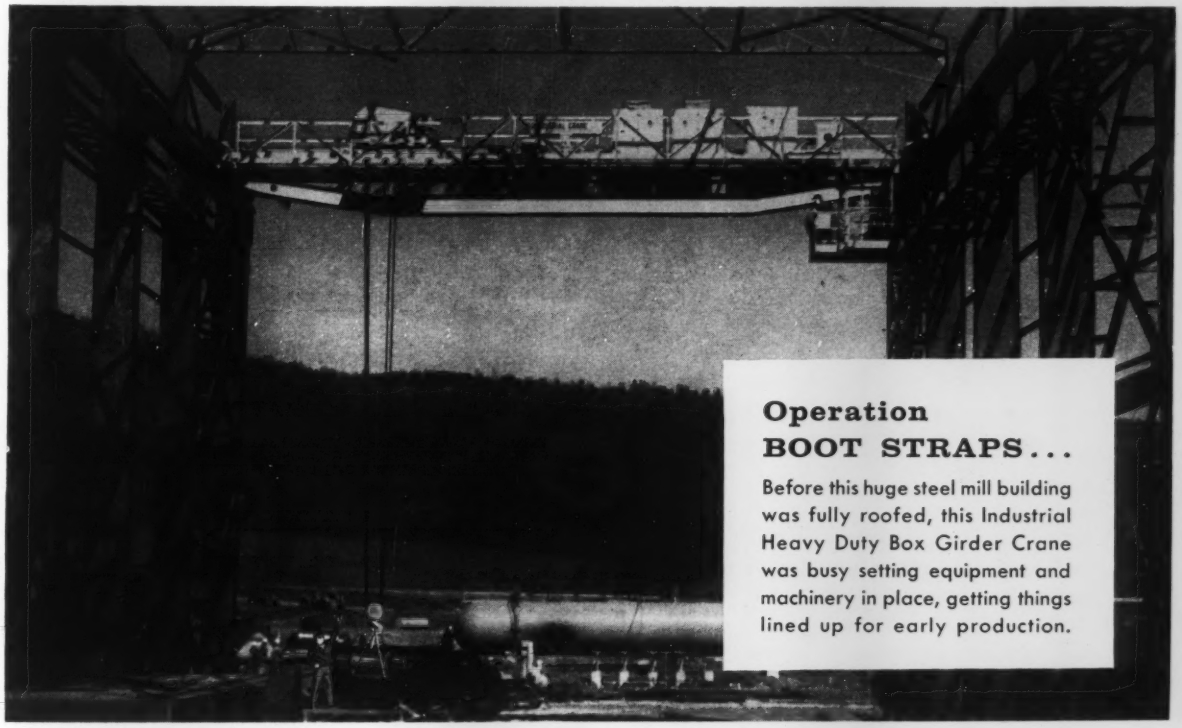
To people who work closely with wiping operations in industry, this is like showing "Capital" in a top hat lighting a cigar with a William Jennings Bryan poster. Or showing Marilyn Monroe in a pinafore. Or Penton printing full blast with a Gutenberg wood screw press.

The reason is that cotton waste is shockingly untypical of modern industry. As a wiping medium, cotton waste is archaic and practically extinct. As a symbol, we feel that it is hardly flattering to industry or labor.

Of course, we're biased and would love nothing better than a picture of brawny hands wiping with clean, white

(Please turn to page 12)

Think of Industrial First!



Operation BOOT STRAPS...

Before this huge steel mill building was fully roofed, this Industrial Heavy Duty Box Girder Crane was busy setting equipment and machinery in place, getting things lined up for early production.

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Heavy-Duty
Box Girder Crane

Another in the versatile Industrial line

- Heavy duty MCB bearings on end trucks and trolley
- Precision machined components
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HEAVY DUTY CRANES

When designs for new plants are in the formulative stages it is wise to call *Industrial* Crane Engineers and reap the benefit of their experience and careful attention to details in planning the overhead crane systems.

Greater economy can be effected by designing an efficient handling system that fits your needs into the original structure rather than adapting an operation to the structure afterwards.

Be sure to specify *Industrial* heavy duty cranes. You'll enjoy the benefits of economical crane performance because *Industrial* cranes combine rugged dependability with ease of maintenance.

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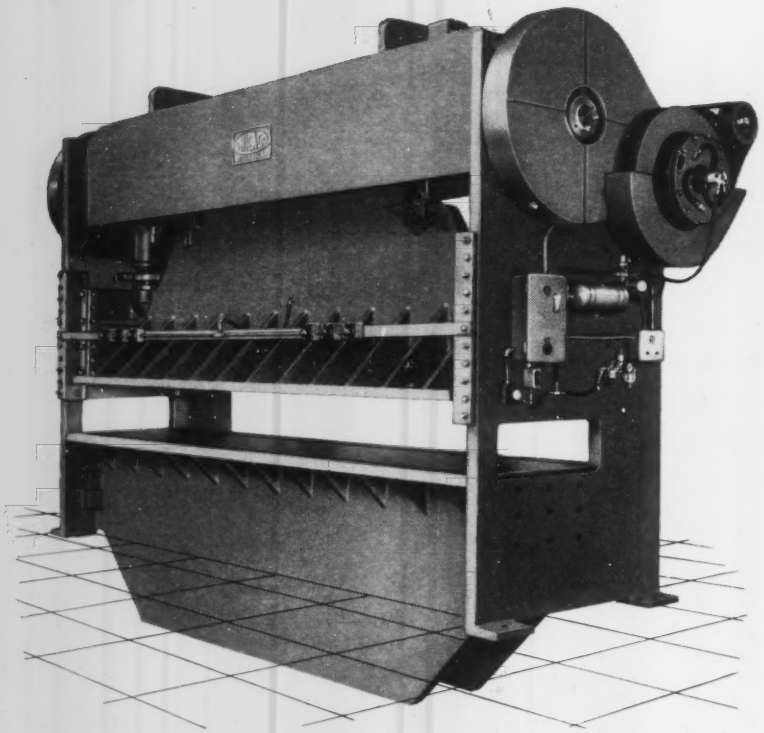

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This is a typical model of CHICAGO straight-side-type presses used for multiple punching, notching, and trimming operations. This press with a die area of 48 inches by 198 inches has a capacity of 200 tons.

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LETTERS

(Concluded from page 10)

paper wipers. The trend is in this direction.

But our question is raised on the basis of aptness, not personal bias. And we have a respect for independence of editorial judgment. So we could not protest the choice of cloth wiping as a cover subject because it is still used widely in industry.

But cotton waste! Whew!

John Gibson
Product Manager, Scott Wipers
Scott Paper Co.
Chester, Pa.

Interested in Extrusion

On going through the May 6 issue of STEEL, we found the article, "Cutting Costs with Impact Extrusions" (page 85), interesting. We shall feel grateful if you will supply us with an extra copy. We were also pleased to read the article, "Impact Extruded Aluminum Cans" (page 98).

We are sheet metal workers and are manufacturing, in addition to other items, flashlight torch cases, which are deep drawn from aluminum, brass and tin plate. At present, we are drawing these under power presses. We are in correspondence with German firms for the supply of impact extrusion power presses. We shall feel grateful if you will put us in touch with manufacturers who may be able to offer us such presses.

J. N. Sharma
J. N. Sharma & Sons
New Delhi, India

• *We are sending tear sheets of the articles mentioned and a list of companies in this country which manufacture impact extrusion presses.*

A Lot of Problems Gathered

Your article on "Motivating Men To Produce More" (June 24, page 76) was most informative. It has gathered a lot of our problems in one article. I would appreciate two additional copies.

Norbert Comeau
Chemical Engineer
Electralab Inc.
Needham Heights, Mass.

We have just finished reading your article, "Motivating Men To Produce More," and were quite impressed by it. We would be able to make good use of three reprints.

O. D. McNitt
Personnel Manager
Pottstown Division
Dana Corp.
Pottstown, Pa.

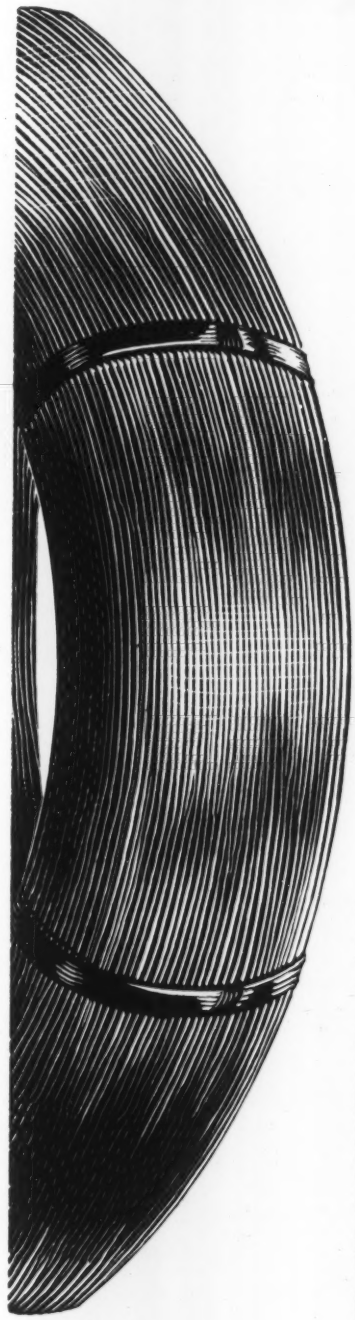
Management Report Helpful

Please send two reprints of the article, "The Foremen—Make Them Managers" (Oct. 11, 1954, page 103), No. 9 in the 1954 Program for Management. I found the article most helpful.

May we have permission to reproduce it for distribution within our plant?

John P. O'Connor
Industrial Relations Department
Shipbuilding Division
Bethlehem Steel Co. Inc.
Quincy, Mass.

• *Permission granted.*



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Basket Handle Wire
Bed Rods
Bessemer Spring Wire
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Bicycle Spoke Wire
Binding Wire
Bolt and Rivet Wire
Bond Wire
Bonnet Wire
Bookbinder Wire
Border Wire
Bottle Handle Wire
Bottling Wire
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Box Hinge Wire
Brace Wire
Brick Cutting Wire
Bright Wire
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Chair Wire
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Channel Pin Wire
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Clasp Wire
Clip Wire
Clothes Line Wire
Clothes Pin Wire
Coat Hanger Wire
Coat and Hat Hook Wire
Coiled Spring Wire
Cold Heading Wire
Concrete Reinforcement Wire
Copper Bearing Wire
Coppered Wire
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Crimping Wire
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Keystone Wire
Lacing Wire
Lantern Wire
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Link Wire
Lintel Wire
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Market Wire
Mat Border Rods
Mat Wire
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A **POWER OPERATED BARREL TYPE SLIDE ADJUSTMENT** facilitates and speeds die-setting. Push button operated, it's not only fast and smooth but permits micro-positioning within a thousandth of an inch.

B **HYDRAULIC INCLINING DEVICE** operates smoothly. The press can be inclined or brought upright in approximately 2 minutes. Operating lever and push buttons conveniently located on left panel leg.

C **BRAIN CENTER OF THE AUTOMATION SYSTEM,** the Rotary Limit Switch can be adjusted precisely while the press is in motion for synchronizing automation devices with press cycle.

D **LOW INERTIA, ELECTRO-PNEUMATIC FRICTION CLUTCH** operates directly on the crankshaft. Most of its weight continues to rotate with the main gear. Only the crankshaft and driving plate are started and stopped at each cycle. Heat and wear are reduced to an absolute minimum. Torque capacity may be changed by adjusting air pressure.

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automated to hit new production highs

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Boasting a revolutionary front-to-back crankshaft design, it's streamlined in an ultra-modern, functionally sound, eye-pleasing way. In fact, it's the only totally-enclosed OBI ever made. There are no exposed, overhanging gears, flywheel or other mechanisms. With the entire driving assembly fully enclosed within the limits of the compact frame, this trim-line performer actually takes up less floor space than any press in its range and category. It's only natural that such a triumphant line of OBI's as this should parade from Niagara . . . for Niagara has been leading the way, *all of the way,* in building all types of OBI's — single crank and double crank, standard and fully automatic. Hailed as "the latest and greatest of them all," the Series EA is built in 4 sizes, with shaft diameters from 4½ to 7½ inches and capacities from 75 to 200 tons.

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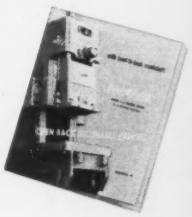

E **AIR CONTROL PANEL AND HYDRAULIC INCLINING SYSTEM** are neatly housed within the left leg. Air line filter, pressure regulator, gages, blow-off valves and lubricators, as well as the hydraulic pump for the inclining system, are all concealed behind a dust-tight door.

F **AUTOMATIC CIRCULATING OIL SYSTEM** (left panel leg) sends metered flow of clean, filtered oil to all bearings and gears in the crown, air counterbalance and slide gibs. Correct operating oil pressure is maintained or the press stops automatically.

G **CONTROLLED AIR SUPPLY AND PNEUMATIC TIMING RELAYS** (left panel leg): Air line receptacles, synchronized with press cycle, are provided for die doper, die kicker and die lifter . . . with auxiliary receptacles for die maintenance tools. Adjustable timing relays control interval of automation functions initiated by rotary limit switch.

H **OPERATOR'S PANEL** (right panel leg) features deluxe operating controls conveniently arranged for fingertip direction of every press motion. Chained to safety block, safety plug de-energizes entire press control when pulled from its receptacle.

I **COMBINATION MOTOR AND PRESS CONTROL PANEL** fully enclosed within the right leg behind a flush-mounted, dust-and-oil-tight door, houses: disconnect switches, circuit protection, transformers, fuses for main motor and auxiliary power supply; control relays; starters for main motor, lubrication and hydraulic pumps.

PNEUMATIC CUSHION is automatically lubricated by self-contained pumping system; internally guided and rigidly supported by press frame.

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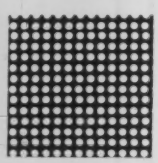

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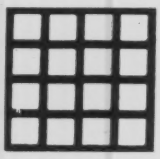

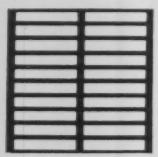

Patterns are available for both industrial and decorative uses

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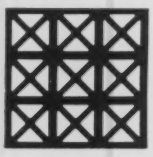

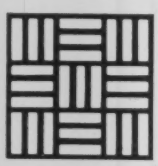

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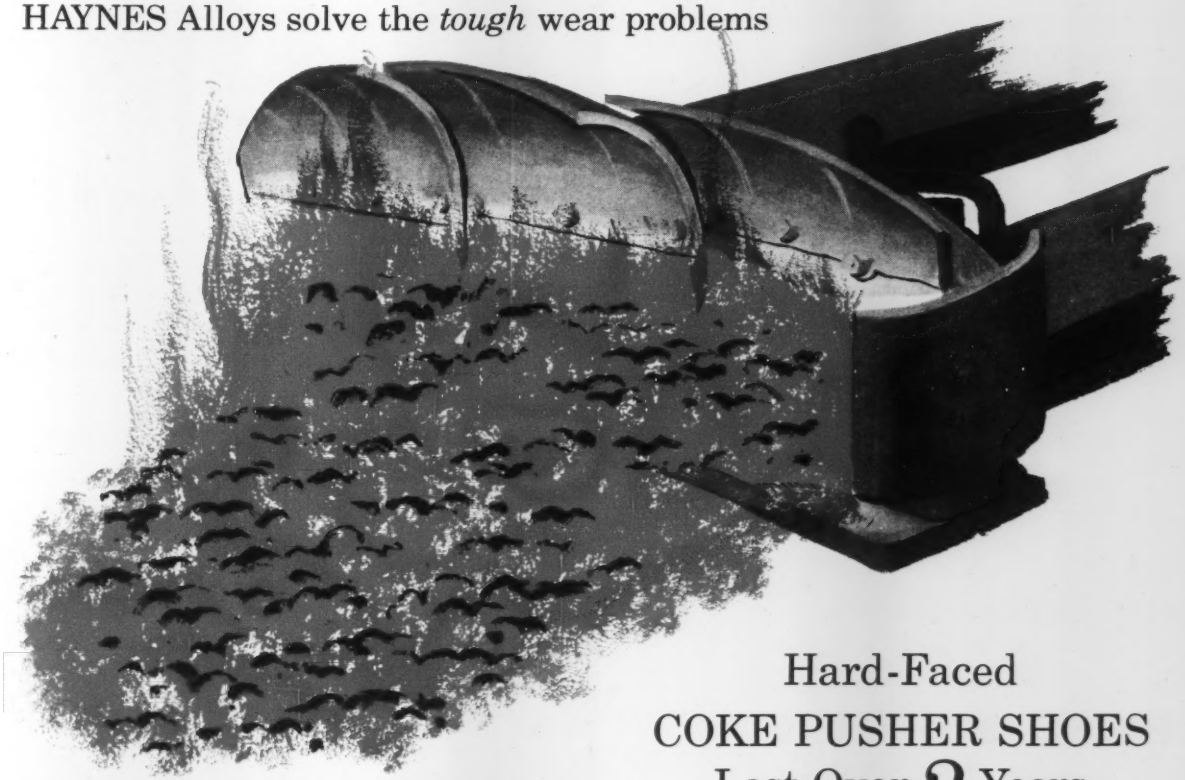
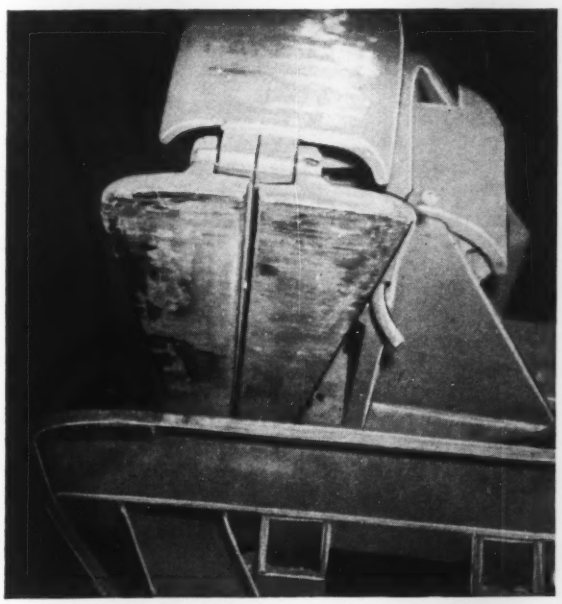


Hard-Faced COKE PUSHER SHOES Last Over 2 Years



These shoes, hard-faced with HAYNES STELLITE alloy No. 1, resist abrasion from the coke particles and the lining of the oven floor. The hard-faced deposit does not chip or spall under the thermal shock of returning from 1800 deg. F., in the oven, to ordinary atmospheric temperatures.

Resisting severe abrasion, heat, and thermal shock produced by riding over the coke-covered floor of 1800-deg. F. ovens—these shoes hard-faced with HAYNES STELLITE alloy No. 1 lasted over two years. Ordinary steel shoes wore out in two months.

Whatever your wear or abrasion problem, there is a HAYNES hard-facing alloy especially made to combat it. There are 18 HAYNES hard-facing alloys . . . a wide selection that assures economical protection from the most severe conditions of heat, corrosion, erosion, or wear. For the complete story write for descriptive literature or contact our nearest sales office. HAYNES STELLITE COMPANY, Division of Union Carbide Corporation, General Offices and Works, Kokomo, Indiana.

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ALLOYS
HAYNES STELLITE COMPANY
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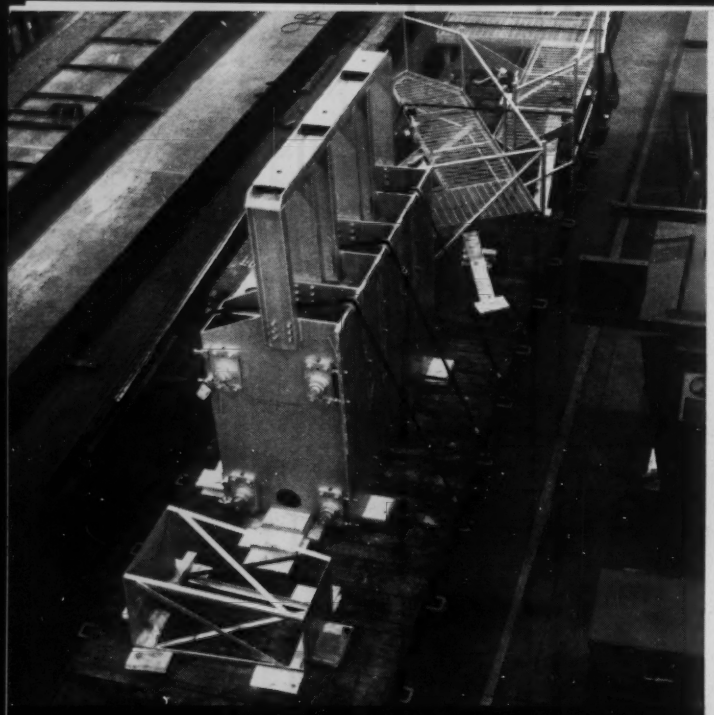
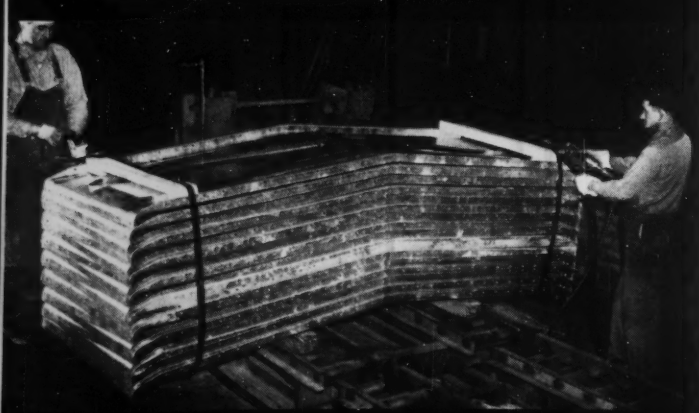


ACME STEEL **STEEL STRAPPING** secures and protects electric furnace for shipment by flat car. *(Idea No. U2-3)*

ACME STEEL **STEEL STRAPPING** unitizes aluminum ingots for better handling and storage. *(Idea No. U6-16)*



ACME STEEL **STEEL STRAPPING** unitizes steel stampings for easier handling and shipping. *(Idea No. U6-20)*

AIM* for better handling, protection, storage

You can gain important materials handling, protection and storage advantages by applying Acme Steel unitizing and carload bracing Ideas to your operations. Safe, secure packages and shipments result in increased handling speed and labor-materials economies, bringing you important savings and greater customer satisfaction. It's easy to find out how.

Located near your plant is an Acme Idea Man thoroughly experienced in product protection for the primary and fabricated metals industries. He is immediately available to discuss your specific problems and provide hundreds of performance-proved Acme Steel Strapping Ideas, without cost or obligation. The seven Ideas on these pages are included among the Ideas-In-Action Reports your Acme Idea Man will be glad to show you. Among these many Reports—all of which have been developed from actual experiences of dozens of industries—are certain to be Ideas that can be applied to your problems, for better, faster, more economical product handling, protection and storage.

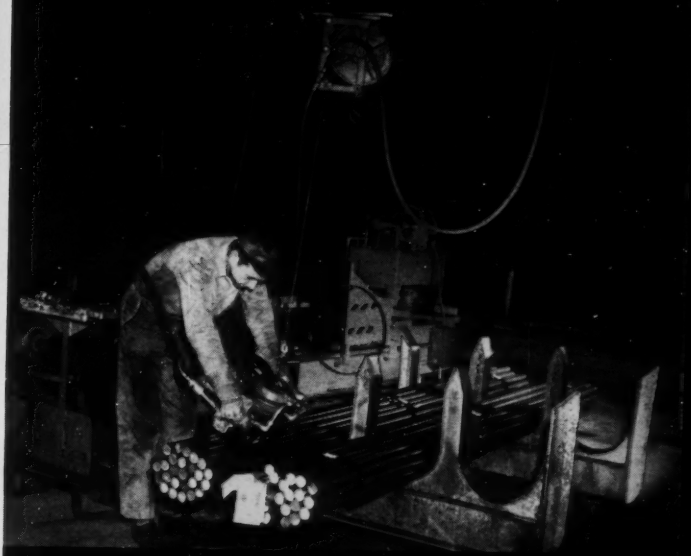
Your *Acme Idea Man can be contacted at the nearest Acme Steel Company office. Simply look under "Steel Strapping" in your classified telephone directory, or send the coupon for full facts and information.

ACME STEEL **STEEL STRAPPING**

ACME STEEL **STEEL STRAPPING** braces loads of wire fencing for safe, secure shipment in gondola cars. *(Idea No. U3-1)*

ACME STEEL **STEEL STRAPPING** palletizes heavy wheel and brake assemblies for fast, mechanical handling. *(Idea No. U6-19)*

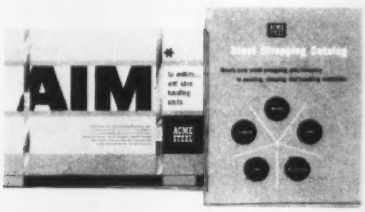
ACME STEEL **STEEL STRAPPING** machine bundles boxes of kitchen utensils for easier handling. *(Idea No. S2-14)*



ACME STEEL **STEEL STRAPPING** applied with pneumatic tools speeds unitizing of cold-drawn steel bars. *(Idea No. U6-18)*

2 IDEA BOOKS

These two information packed Acme Steel Idea Books are available to you on request. They will provide dozens of clues to better ways to package and protect your products and plant output.



Write today for your choice of the above two Acme Steel Idea Books. Merely indicate the books you want on the coupon at the right and mail. Your request will be filled promptly, with no obligation.

Acme Steel Products Division
ACME STEEL COMPANY, Dept. SDU-77
Chicago 27, Illinois

Please send me the new Acme Steel Idea Books I have checked below:

☐ Steel Strapping Catalog ☐ Unitizing Catalog
☐ Have an Acme Idea Man call.

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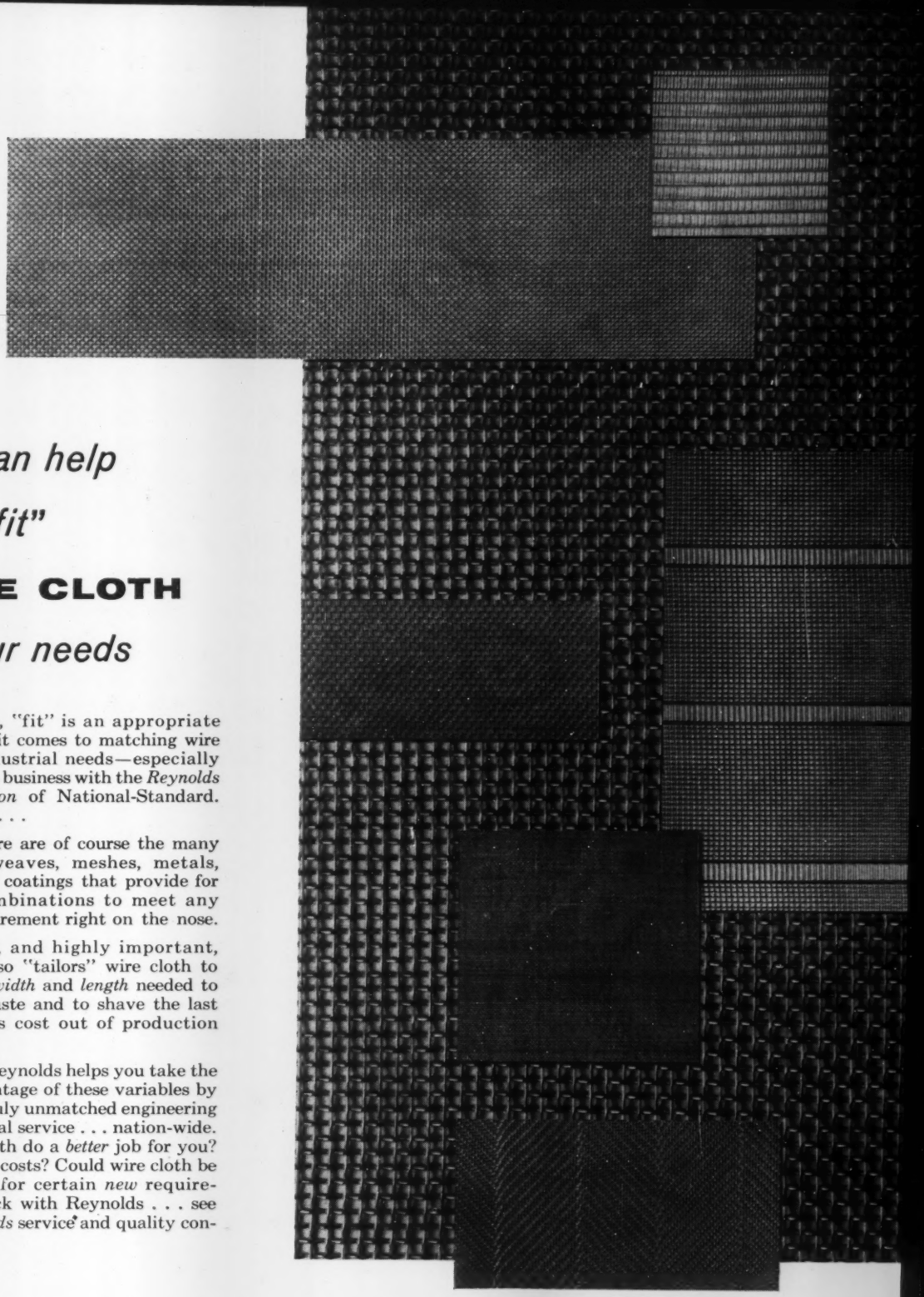
12. Bonded Case Seal Limited Contact Lip Thin Rind Type
5. Bonded Washer Seal Straight Lip With Garter Spring
13. Rubber Covered Bonded Case Seal Straight Lip
6. Bonded Washer Seal Limited Contact Lip With Garter Spring
14. Rubber Covered Bonded Case Seal Limited Contact Lip
7. Bonded Case Seal Straight Lip
15. Rubber Covered Bonded Case Seal Straight Lip With Garter Spring
8. Bonded Case Seal Limited Contact Lip
16. Rubber Covered Bonded Case Seal Limited Contact Lip With Garter Spring

P4



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you "fit"

WIRE CLOTH

to your needs

These days, "fit" is an appropriate word when it comes to matching wire cloth to industrial needs—especially when you do business with the *Reynolds Wire Division* of National-Standard. Here's why . . .

First, there are of course the many different weaves, meshes, metals, finishes and coatings that provide for infinite combinations to meet any special requirement right on the nose.

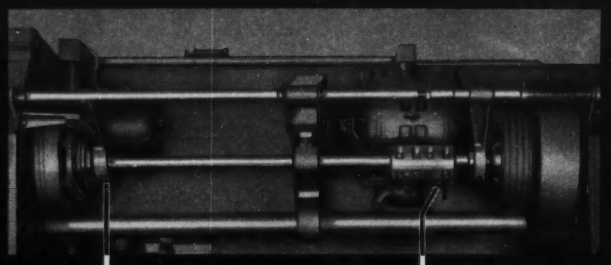
Secondly, and highly important, Reynolds also "tailors" wire cloth to the precise *width* and *length* needed to minimize waste and to shave the last bit of excess cost out of production operations.

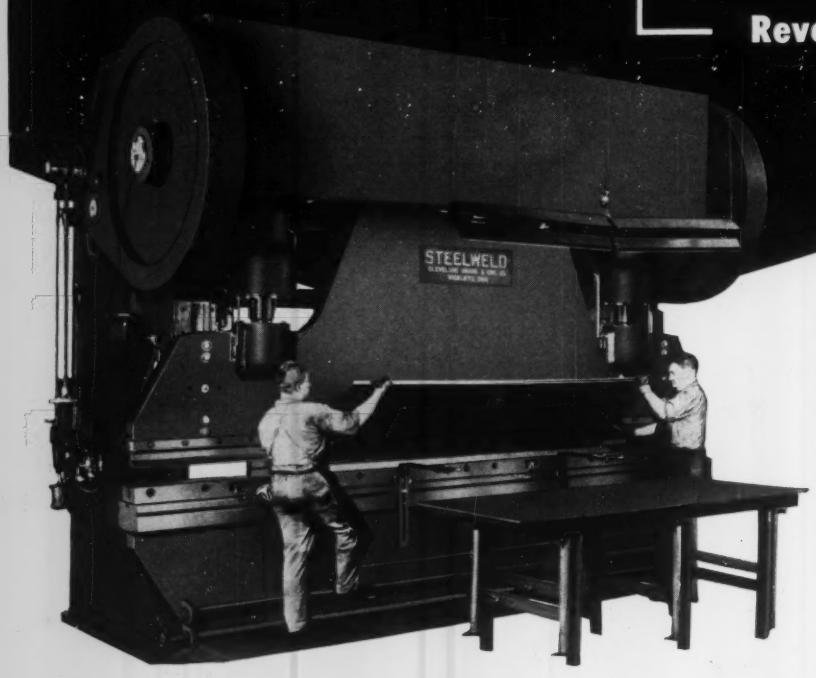
Finally, Reynolds helps you take the fullest advantage of these variables by providing truly unmatched engineering and analytical service . . . nation-wide. Can wire cloth do a *better* job for you? Can you cut costs? Could wire cloth be the answer for certain *new* requirements? Check with Reynolds . . . see what *Reynolds* service and quality control offers!

NATIONAL NS NATIONAL-STANDARD Company **STANDARD**

DIVISIONS: NATIONAL-STANDARD, Niles, Mich.; *fine wire, stainless, music spring and plated wires* • WORCESTER WIRE WORKS, Worcester, Mass.; *music spring, stainless and plated wires, high and low carbon specialties*
WAGNER LITHO MACHINERY, Secaucus, N. J.; *metal decorating equipment* • ATHENIA STEEL, Clifton, N. J.; *flat, high carbon spring steels* • REYNOLDS WIRE, Dixon, Ill.; *industrial wire cloth*

Reversing Ram Simplifies Press Operation





Model MO 6-12. Handles plate to 16'-6" x 7/16". Other Steelwelds available for working plate to 24 feet and thicknesses to one inch.

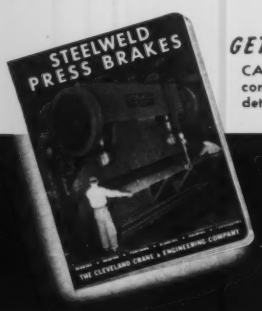
With a reversing ram drive you can back the ram or upper die away from the work at any point in the stroke. It is not necessary for the ram to continue through in one direction as when only the normal press drive is provided.

This feature speeds locating the correct ram position to achieve a specified bend or shape. It saves time and spoilage when trying new dies.

Reversing ram machines have two complete drives, including motor, flywheel and clutch. They are controlled by individual foot pedals on two different shafts, located one above the other across the front of the press.

The reversing ram feature is optional and may be provided on any Steelweld Bending Press. It adds greatly to the ease of operation and because of time-savings it enables, rapidly absorbs the extra original cost.

Steelweld Bending Presses are such versatile tools with so many outstanding features that we urge you to learn all about them. As a starter, send for the catalog below.



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BRAKING • FORMING • BLANKING • DRAWING • CORRUGATING • PUNCHING

CALENDAR
OF MEETINGS

July 24-27, National Tool & Die Manufacturers Association: Summer meeting, Grove Park Inn, Asheville, N. C. Association's address: 907 Public Square Bldg., Cleveland 13, O. Executive secretary: George S. Eaton.

Aug. 5-6, National Screw Machine Products Association: National sales conference, Moraine hotel, Highland Park, Ill. Association's address: 2860 E. 130th St., Cleveland 20, O. Executive vice president: Orrin B. Werntz.

Aug. 12-15, Society of Automotive Engineers: West coast meeting, Olympic hotel, Seattle. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Aug. 20-23, Western Electronic Show & Convention: Cow Palace, San Francisco. Information: WESCON, 342 N. LaBrea, Los Angeles 36, Calif.

Aug. 28-30, American Institute of Electrical Engineers: Pacific general meeting, Chinook hotel, Yakima, Wash. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

Sept. 8-11, National Metal Trades Association: Eastern plant management conference, Essex-Sussex hotel, Spring Lake, N.J. Association's address: 337 W. Madison St., Chicago 6, Ill. Secretary: Charles L. Blatchford.

Sept. 9-11, American Mining Congress: Metals mining and industrial minerals convention, Utah and Newhouse hotels, Salt Lake City, Utah. Congress' address: 1102 Ring Bldg., Washington 6, D.C. Executive vice president and secretary: Julian D. Conover.

Sept. 9-12, Society of Automotive Engineers: Tractor meeting and production forum, Hotel Schroeder, Milwaukee. Society's address: 485 Lexington Ave., New York 17, N.Y. Secretary: John A. C. Warner.

Sept. 9-13, Instrument Society of America: Annual instrument - automation conference and exhibit, Public Auditorium, Cleveland. Society's address: 313 Sixth Ave., Pittsburgh 22, Pa. Executive director: William H. Kushnick.

Sept. 12-14, Automotive Parts Rebuilders Association: Annual meeting and exhibit, Congress hotel, Chicago. Association's address: 220 S. State St., Chicago 4, Ill. Executive secretary: Jack O'Sullivan.

Sept. 17-20, American Die Casting Institute: Annual meeting, Edgewater Beach hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N.Y. Secretary: David Laine.

Sept. 18-20, National Industrial Conference Board: Marketing meeting, Waldorf-Astoria hotel, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Sept. 21-24, Steel Founders' Society of America: Fall meeting, Homestead, Hot Springs, Va. Society's address: 606 Terminal Tower, Cleveland 13, O. Secretary: George K. Dreher.

Sept. 22-24, American Machine Tool Distributors Association: Annual meeting, Hotel Cleveland, Cleveland. Association's address: 1900 Arch St., Philadelphia 3, Pa. General manager: James C. Kelly.

Sept. 22-25, American Institute of Wholesale Plumbing & Heating Supply Association Inc.: Annual meeting, Waldorf-Astoria hotel, New York. Institute's address: 402 Albee Bldg., Washington 5, D. C. Executive secretary: George T. Underwood.

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When you specify Metalwash you share in the skill and experience we have developed in more than thirty years of specializing in the design and manufacture of machinery and methods for metal parts processing.

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Use WELDED STEEL for Greater Strength with Less Weight!

The weldment shown above is one half of the base for a 300,000 KW Steam Turbine... it weighs over 100 tons. This base, and the units shown at left, are typical of the thousands of Steel-Weld Fabricated parts and assemblies produced by Mahon each year for manufacturers of processing machinery, machine tools, and other types of heavy mechanical equipment. Are you taking full advantage of the economies offered by welded steel components in your products? In the design of almost any type of heavy machinery, or mechanical engineering project, there are parts and sub-assemblies that can be produced more economically and more satisfactorily in welded steel . . . because, in weldments you get greater strength with less weight, plus the additional advantages of greater rigidity and 100% predictability. When you consider weldments, you will want to discuss your requirements with Mahon engineers, because, in the Mahon organization you will find a unique source for weldments or welded steel in any form . . . a fully responsible source with complete facilities for design engineering, fabricating, machining and assembling . . . a source where design skill is backed-up by craftsmanship which assures you a finer appearing product embodying every advantage of Steel-Weld Fabrication. See Sweet's Product Design File for information, or have a Mahon sales engineer call at your convenience.

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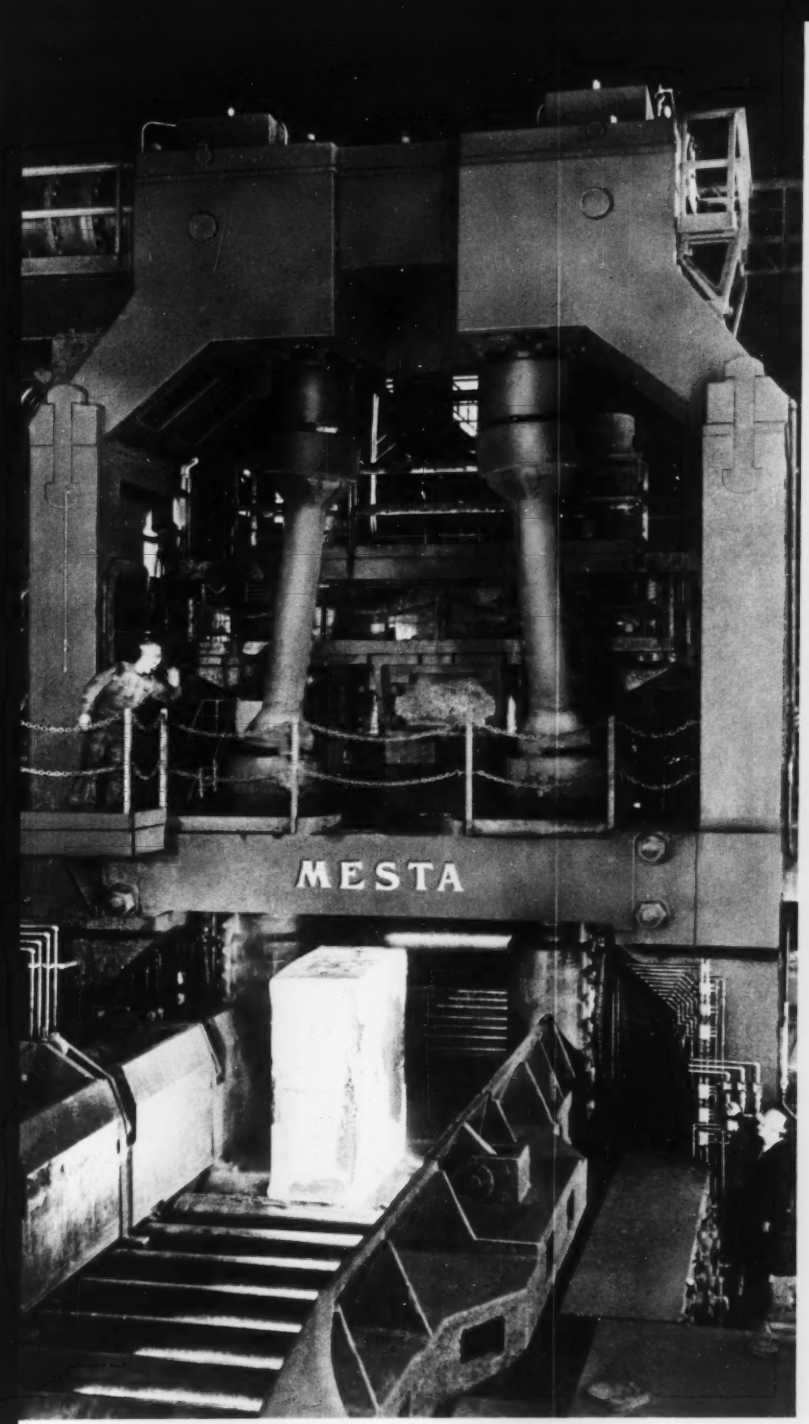


Knocking down an ingot on schedule places heavy demands on your primary reversing mill. Drives and auxiliary equipment take rough abuse. To give you an edge in meeting demands, Westinghouse drives are engineered from long experience. New advances in Westinghouse automatic controls and coordinated auxiliary equipment keep your mill on schedule. MP-3051

Experienced engineering and development

KEY TO HIGHER TONNAGE

...with Westinghouse-equipped reversing mills

YOU CAN BE SURE...IF IT'S Westinghouse

Dependability is tailor made

Experience tailors each drive

Today, reversing mill drive equipment takes heavier abuse than ever before. Growing operating and tonnage requirements can't be met by yesterday's set of standards. That's why experienced engineering at Westinghouse tailors each drive to the specific mill. In this way, you can be sure of top performance, maximum accessibility to all parts of the drive, and rugged construction quality for reliability today and long into the future.

The Westinghouse reversing mill drive, at right, is a good example. Main drive is a 12,000 hp., 40/80 rpm double-armature twin motor. Edger drive (top) is a 4,000 hp., 60/150 rpm double-armature motor. Time-saving accessibility is provided by: 1) large walk-in endbells, 2) extra space for brush accessibility, both radially and axially, and 3) absence of baffle restrictions between the commutator area and the stator or rotor windings.

Heavy-duty thrust bearings are located at the mill end of the main drive pedestal bearings to permit easy, routine inspections. Removable end-case permits complete inspection and maintenance without disturbing either journal bearing or bearing cap.

Rugged construction of the Westinghouse reversing mill drive incorporates heavy-duty bedplates supported on concrete foundations. Pedestal cap bolts and base bolts extend deep into foundation concrete. Mill-end bearings are supported by massive pedestals using foundation keys. Each armature coil is rigidly and individually braced, front and rear. Armature coil cross connections are securly encased in a steel box at the rear of the rotor and flexibly connected to armature coils.

Oscillotrol (R) thrust oil-damper system effectively damps out rotor oscillations caused by pulses from mill-spindle coupling action on twin-drive motors.

MP-3051

YOU CAN BE SURE...IF IT'S Westinghouse

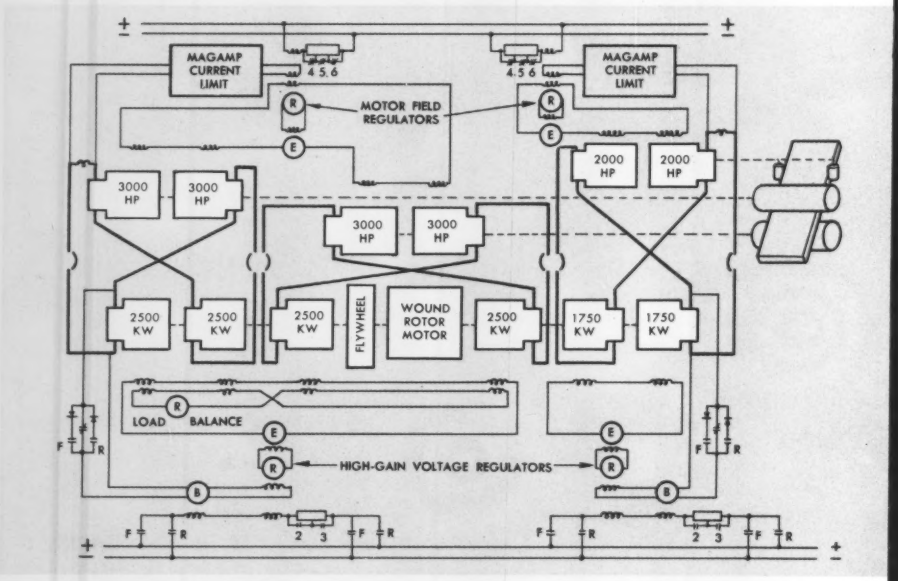
SYSTEM FEATURES

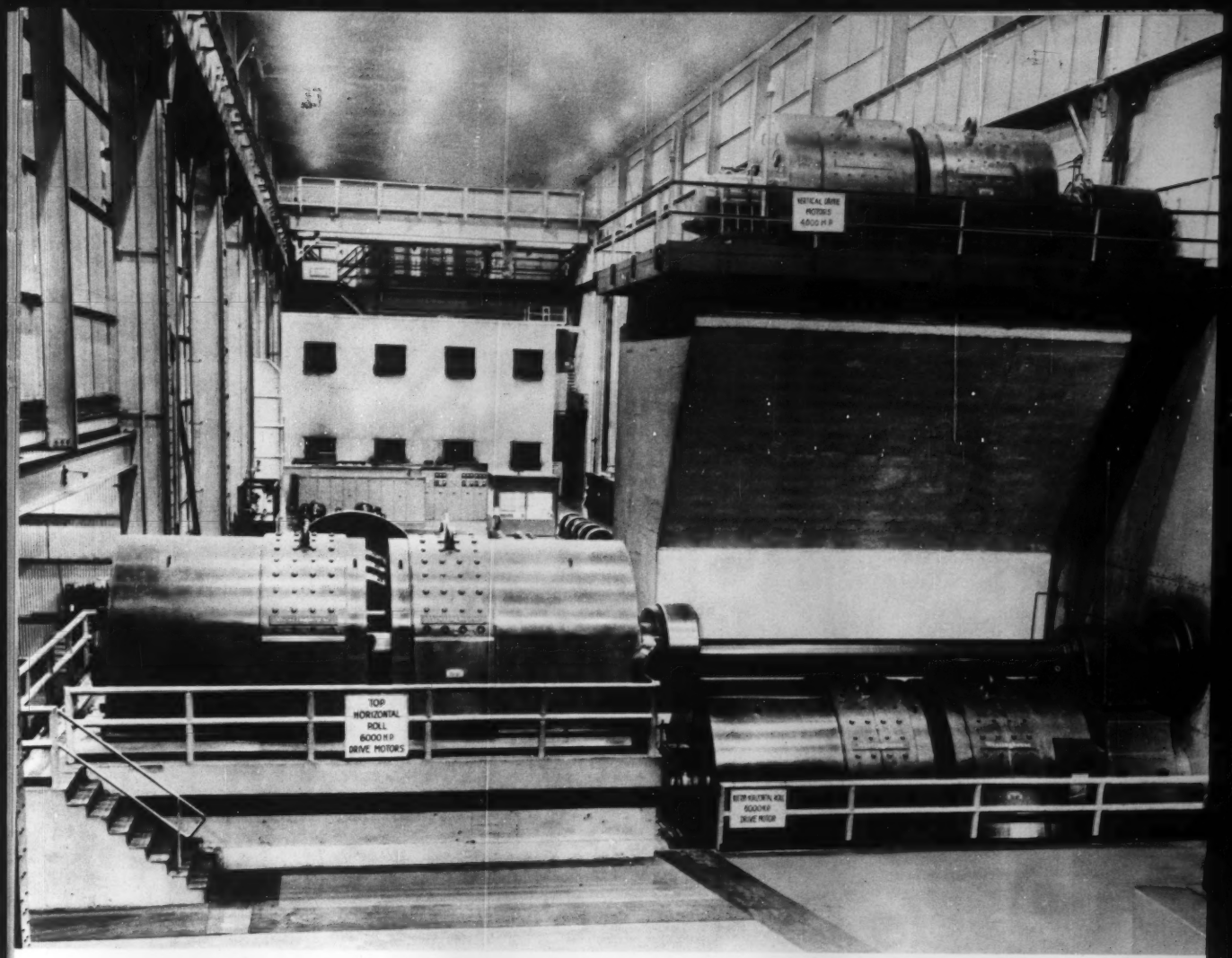
Sandwich series loops are used for each of the pairs of double-armature twin-drive motors and for the double-armature edger motor to minimize the number of circuit breakers and load balance equipment. A load balance regulator excites auxiliary fields on the 2500 kw generators to balance the twin-drive motor loads.

High-gain voltage regulators excite generators to give fast changes in response to the operator's controls.

Motor field regulators excite motors to give changes in speed by motor-field control.

MAGAMP (R) (magnetic amplifier) current-limit regulator builds up motor field strength to increase the torque per ampere for loads approaching 200%.





Typical reversing mill drive using 12,000 hp, 40/80 rpm double-armature twin motor. Edger drive (top) is 4,000 hp, 60/150 rpm double-armature motor.

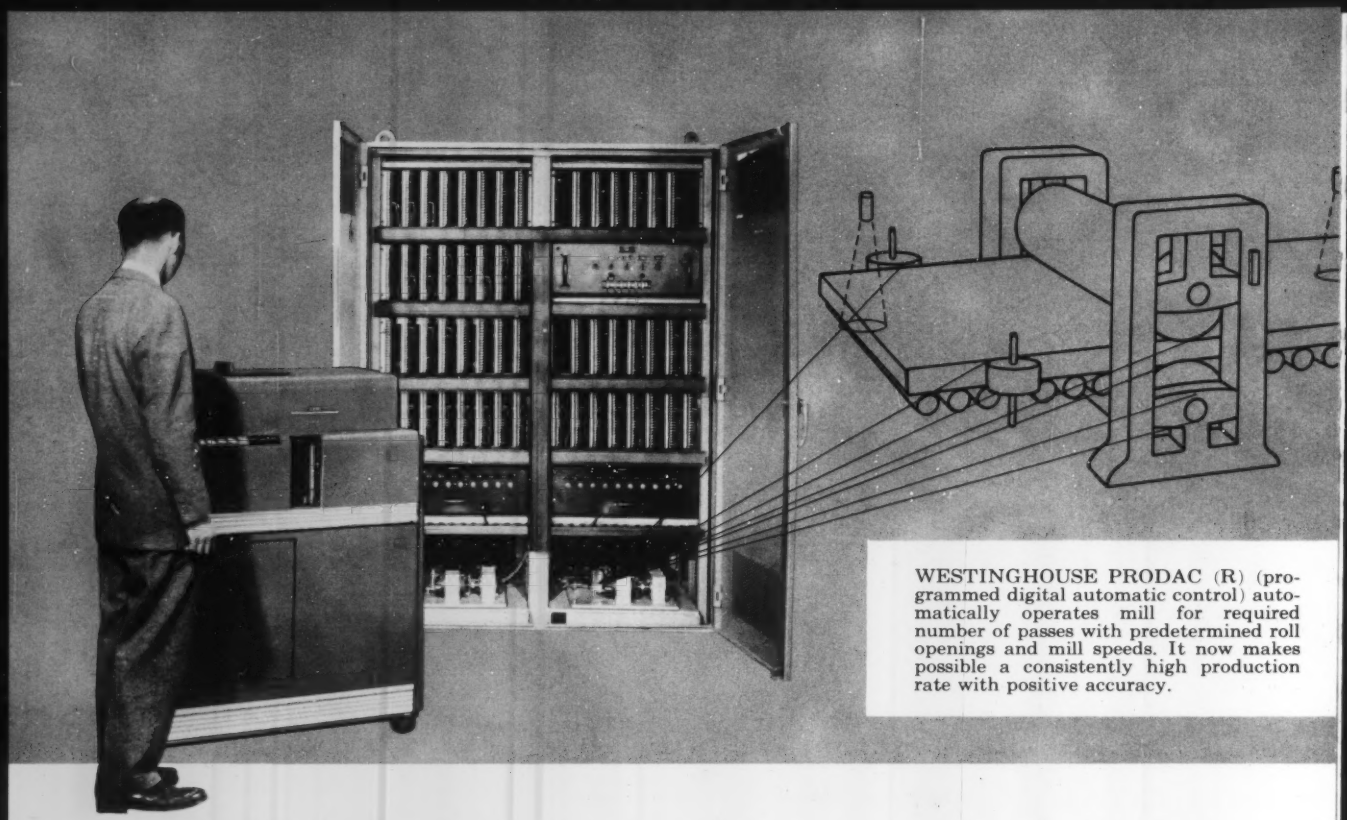
WESTINGHOUSE EQUIPMENT SERVES THESE USERS

YEAR	CUSTOMER	LOCATION	MILL	HP	RPM
1951	U. S. Steel Corporation	Fairless Hills, Pa.	40″ Blooming Mill	8000*	65/130
1951	☆Sheffield Steel Division	Kansas City, Mo.	32″ Blooming Mill	4000	60/150
1951	Laclede Steel Company	Alton, Illinois	35″ Blooming Mill	5000	60/150
1951	Dow Chemical Company	Madison, Illinois	84″ Reversing Mill	6000	55/156
1951	U. S. Steel Corporation	Morrisville, Pa.	Universal Slabbing Mill	12000*†	40/80
1951	°Great Lakes Steel Corporation	Detroit, Michigan	Universal Slabbing Mill	12000*†	40/80
1953	Reynolds Metals Company	McCook, Illinois	144″ Taper Mill	3000	125/250
1954	Inland Steel Company	Indiana Harbor, Ill.	Wide Flange Beam Mill	7000†	80/160
1955	Aluminum Co. of America	Davenport, Iowa	160″ Slabbing Mill	7000*	30/60
1955	Empressa Nacional Siderurgica	Spain	132″ Plate Mill	7000*	40/80
1955	Jones & Laughlin Steel Corp.	Cleveland, Ohio	Slabbing Mill	10000*	40/100
1955	Kaiser Al. & Chem. Corp.	Ravenswood, W. Va.	168″ Slabbing Mill	10000*†	30/60
1955	Kaiser Al. & Chem. Corp.	Ravenswood, W. Va.	110″ Slabbing Mill	6000	30/60
1955	Republic Steel Corp.	Cleveland, Ohio	Universal Slabbing Mill	12000*	40/80
1955	Jones & Laughlin Steel Corp.	Aliquippa, Pa.	Reversing Rougher	6000*	40/100
1955	Jones & Laughlin Steel Corp.	Cleveland, Ohio	Reversing Rougher	8000*	40/80
1955	Crucible Steel Co. of America	Midland, Pa.	Roughing Mill	3500	50/150
1955	Armco Steel Corporation	Butler, Pa.	Reversing Rougher	7000	40/100
1956	U. S. Steel Corporation	South Chicago, Illinois	Blooming Mill	12000*†	40/80
1956	U. S. Steel Corporation	Gary, Indiana	Universal Slabbing Mill	12000*†	40/80
1956	Altos Hornos	Mexico	Blooming Mill	6000*	40/80
1956	Large Eastern Steel Company		Blooming Mill	3000	60/150
1956	Reynolds Metals Company	Listerhill, Alabama	170″ Slabbing Mill	7000*	30/60
1956	Tata Iron & Steel	India	Reversing Rougher	3500*	60/150
1956	Kaiser Steel Company	Fontana, California	90″ Slabbing Mill	10000*	40/100
1956	Olin Mathieson Chem. Corp.	Omal, Ohio	96″ Slabbing Mill	5000	35/70
1956	Empire Steel Corporation	Mansfield, Ohio	Reversing Rougher	5000	50/120

☆Armco Steel Corp. °Division of National Steel Corp. *Twin Drive †Double Armature

MP-3051

Auxiliary equipment takes over more responsibility



WESTINGHOUSE PRODAC (R) (programmed digital automatic control) automatically operates mill for required number of passes with predetermined roll openings and mill speeds. It now makes possible a consistently high production rate with positive accuracy.

Reversing mills are more precise, automatic with Westinghouse auxiliaries

Continued research and development by Westinghouse helps to make your operations more precise and automatic. A recent example is PRODAC control. It makes possible the first completely automatic mill with card-programmed rolling information.

Unmatched Westinghouse engineering for high-tonnage reversing mill operation is at your service . . . from planning to design, installation and start-up. A skilled Westinghouse team will accept unit responsibility and work with you and your consulting engineers.

Contact your Westinghouse sales office for further details . . . Westinghouse Electric Corporation, 3 Gateway Center, P.O. Box 868, Pittsburgh 30, Pa.

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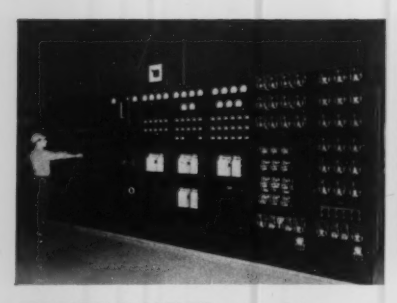

WESTINGHOUSE main-drive control panels provide centralized start-up switches for fans and motor-generator sets, and metering for power and regulating circuits.

WESTINGHOUSE variable voltage control for all auxiliaries minimizes handling time. Transfer switches and emergency bus arrangement afford relief in case of generator failure.

MCT600 INDIVIDUAL TABLE ROLL MOTOR, silicone insulated; drives mill tables directly; in ratings at 230 volts; frame sizes from 604 to 618; 3.75 hp to 50 hp, 157 rpm to 85 rpm.

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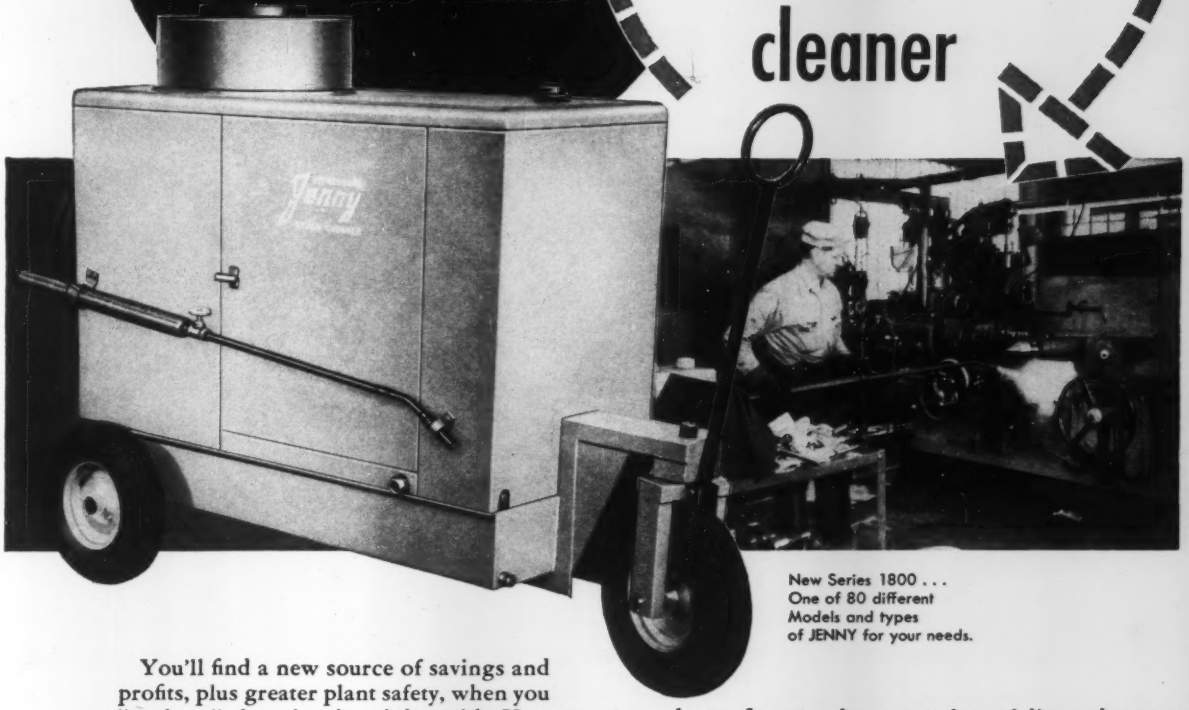
tool up
FOR YOUR
cleaning jobs...
...prevent fires

with HYPRESSURE Jenny steam cleaner



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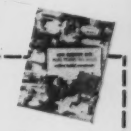
One of 80 different
Models and types
of JENNY for your needs.

You'll find a new source of savings and profits, plus greater plant safety, when you "tool up" for cleaning jobs with Hypressure Jenny Steam Cleaner. Jenny removes grease, cutting oils, and protective coatings from machinery, equipment, sub-assemblies, and castings, before repair, repainting or machining—and does it ten times faster than by ordinary methods! It promotes safety by eliminating the fire hazard of greasy conveyor chains and floors, and the use of inflammable cleaning solvents. It cleans ribbed glass windows for better illumination; keeps floors and runways free of dirt and grease for safer, faster plant traffic. Jenny steam cleaning often reveals damaged or worn parts for repair before costly production delays or breakdowns occur. In fact, Jenny does most any cleaning job for one-tenth the cost of cleaning by hand. So find out how easy it is to bring these savings and safety to your plant.

Mail the coupon today for full facts.
No obligation.



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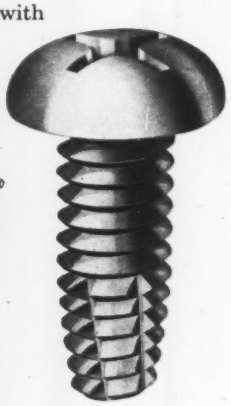
VALVE MANUFACTURING COMPANY
"Serving Since 1892"
P.O. BOX 22 CORAOPOLIS, PA.

PARKER-KALON SELF-TAPPING SCREWS "MOW DOWN" ASSEMBLY PROBLEM FOR CLEMSON LAWN MOWERS

"Our problem," says Mr. Charles Kellogg, chief engineer, Clemson Lawn Mower Div., "was fastening an 8" plastic ring into a wheel rim to hold a protective cover. We needed a screw which would cut threads into a tough plastic—a fastening which would hold securely against vibration set up by the power unit. In addition, we had to consider an awkward drive angle and the danger of marring the finish.

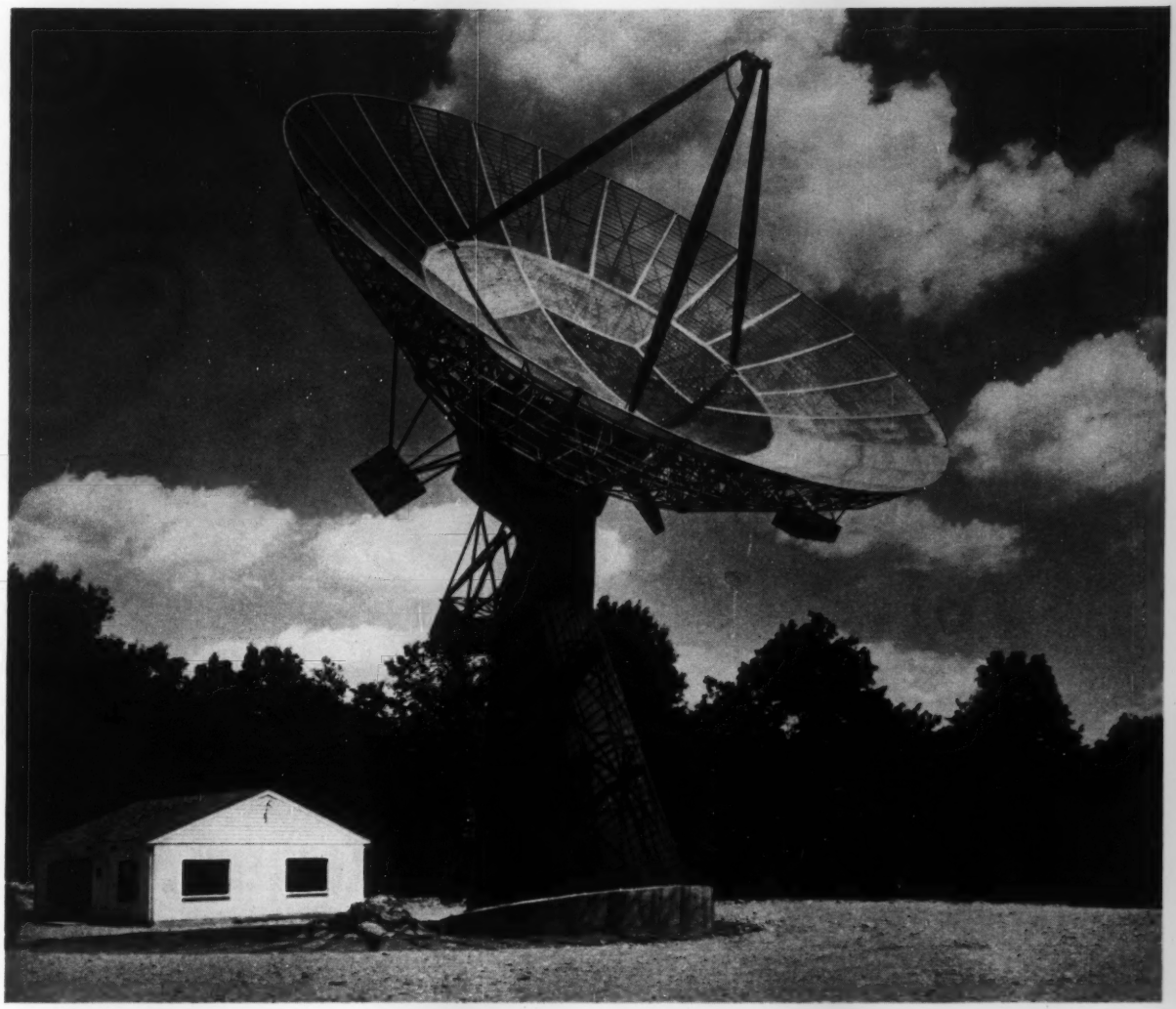
"The fasteners we were using couldn't measure up. So we replaced them with P-K Type F screws. They're working fine."

This is another example of how Parker-Kalon fits the screw to the job. Whatever the nature of your fastening problem, it will pay you to ask your nearby Industrial Distributor for complete information and P-K fastener samples.



PARKER-KALON® fasteners

PARKER-KALON DIVISION, *General American Transportation Corporation. Self-tapping Screws, Socket Screws, Screw-nails, Masonry Nails, Wing Nuts and Thumb Screws. Sold everywhere through leading Industrial Supply Distributors. Factory: Clifton, New Jersey—Warehouse: Chicago and Los Angeles.*



What a radio telescope can tell you about expanded aluminum

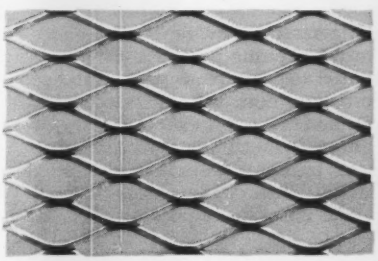
In designing Harvard University's new 60-foot radio telescope, the D. S. Kennedy & Co. found many advantages in Penmetal expanded aluminum. These include . . .

Openings of just the right size: Small enough to present an effectively solid surface to the radio signals; large enough to minimize wind resistance.

Corrosion resistance: To provide 'round-the-clock weather protection.

Inherent structural strength, which helps to prevent distortion with movement of the reflector, and reduces the bracing required.

Light weight: As the mesh covers the entire area of the reflector, the fact that it weighs only a fraction



of a pound per square foot was an important consideration.

Low cost, which enabled the large area to be covered economically.

Easy fabrication with standard tools.

These same characteristics have made Penmetal expanded aluminum the choice for a wide variety of applications. It is available in a number of different mesh sizes to suit almost any requirement.

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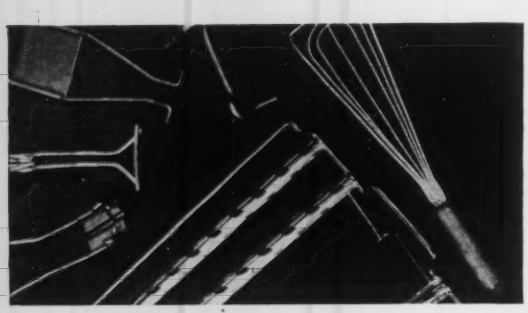
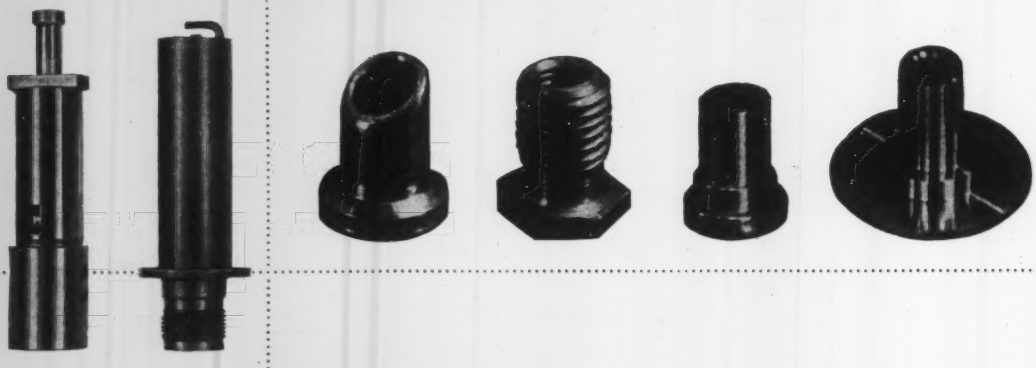
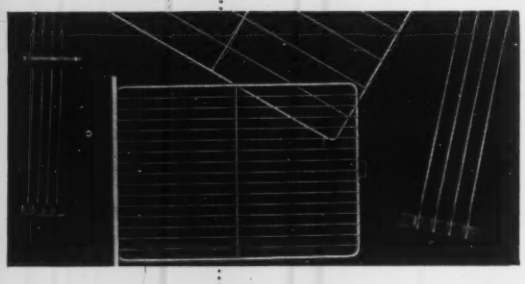
Penmetal

PM-143



If you use STAINLESS BARS or WIRE...





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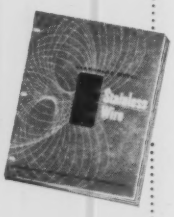
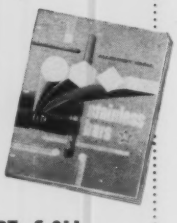
Illustrated 20 page booklet, which fully describes analyses, physical properties, corrosion resistance, principal uses and applications of stainless wire.



ALLEGHENY STAINLESS BARS

Illustrated 28 page booklet, which fully covers alloy selection, fabrication, annealing, heat treating, corrosion resistance and weight of stainless bars.



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Whether you use stainless bars and wire to provide lasting, easily-cleaned sparkle for refrigerator shelves, to stand up under the metal-torturing heat of a jet engine or to meet any requirements of resistance to corrosion, heat, wear or great stress, you'll find that the combination of Allegheny Stainless Steel and Allegheny Ludlum technical assistance can offer distinct production advantages that will help your competitive position.

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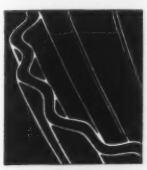
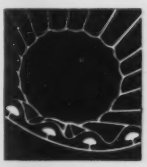


Corrugations speed heat dissipation and permit expansion and contraction without buckling or cracking of the walls.

Expansible rim eliminates distortion of open diameter, maintaining proper fit of the pot in the trunnion ring.



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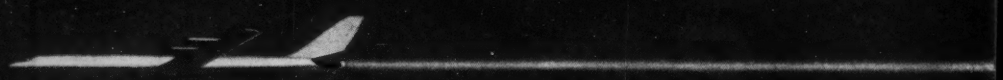

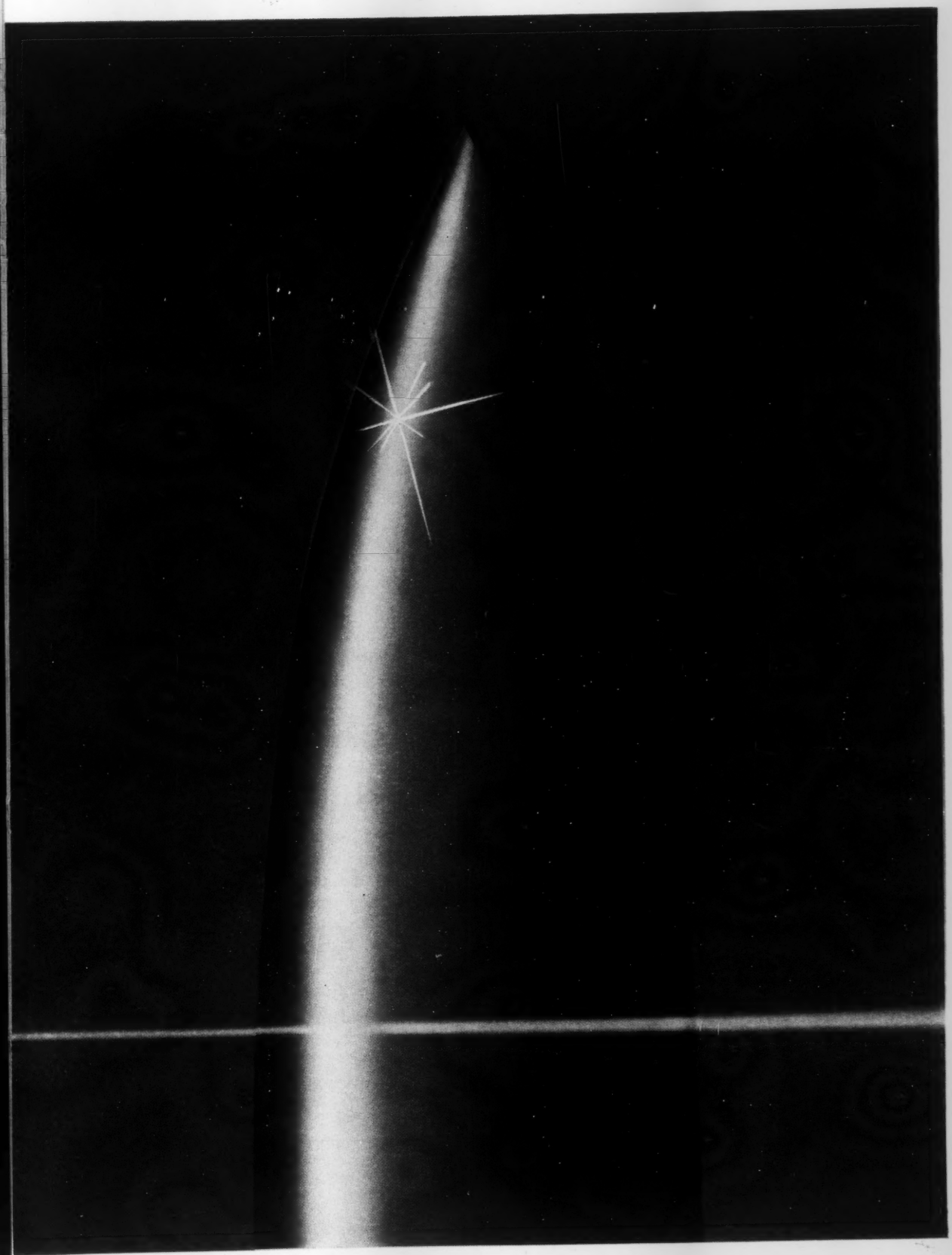

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The Aircomatic arc welding process using carbon dioxide gas as the shielding medium, means high economy and speed in certain mild steel welding applications.

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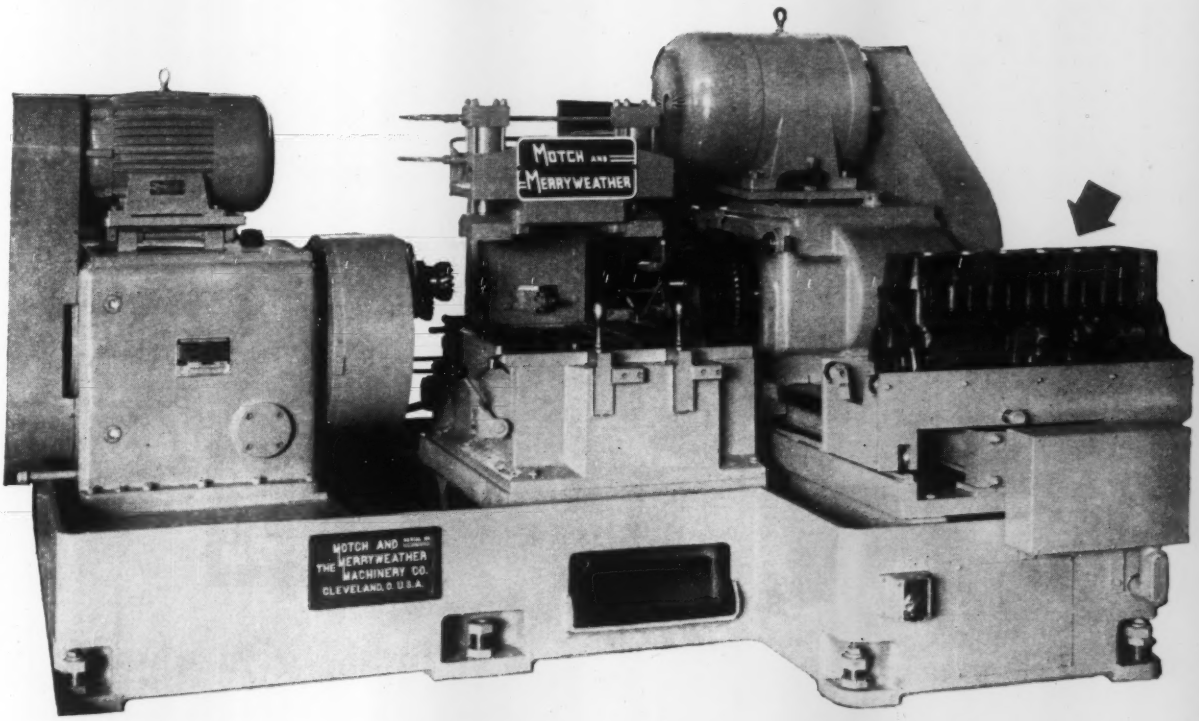
M&M develops another specialized machine



Special Duplex Milling Machine

more than doubles milling production on cylinder blocks

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In addition to boosting production from 22 to 50 blocks per hour, this M&M machine has greater strength in planetary milling unit, gives longer cutter life and more accuracy. Its extreme rigidity permits rough and finish operations in one pass of the heads.

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for low cost inert gas arc welding of mild steel

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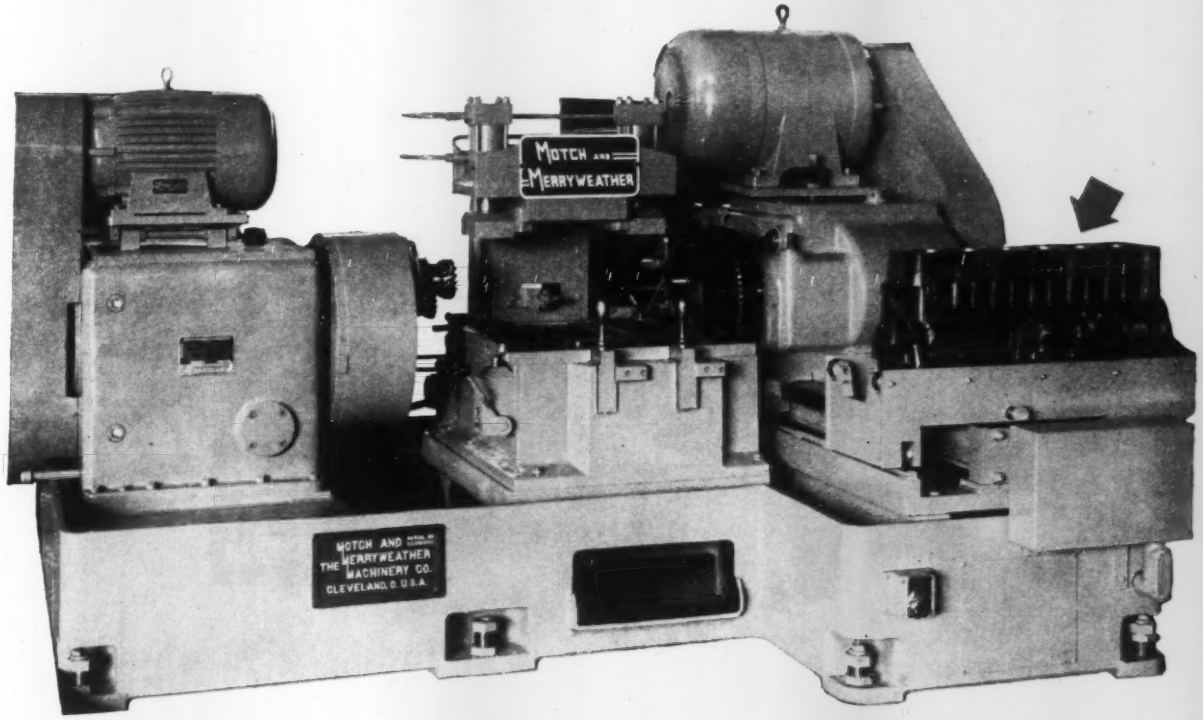
M&M develops another specialized machine



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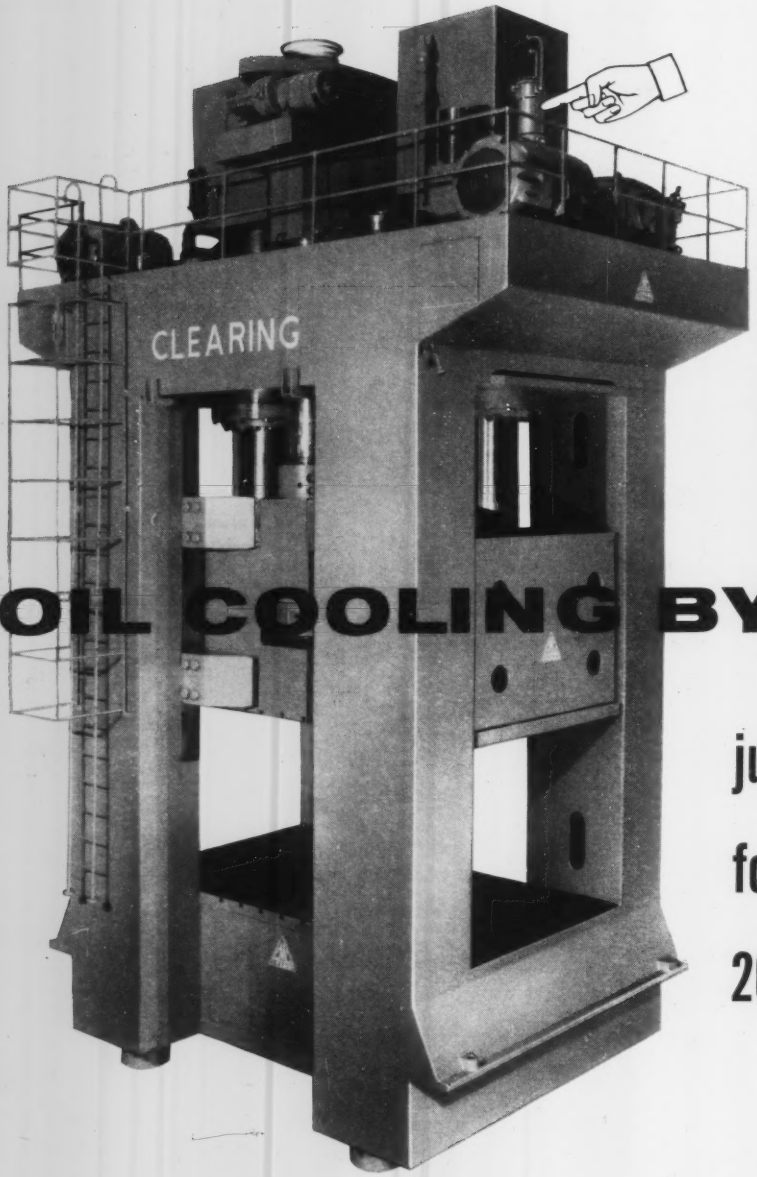

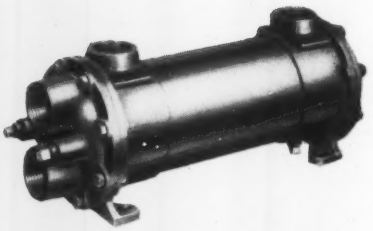

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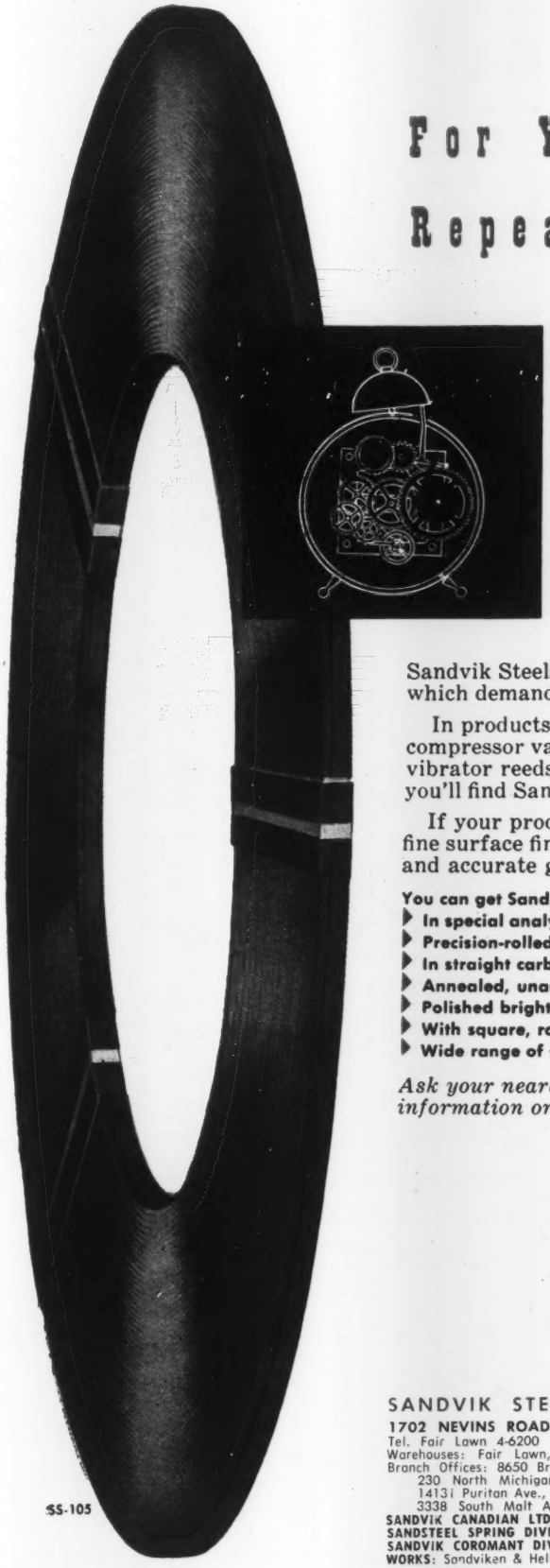

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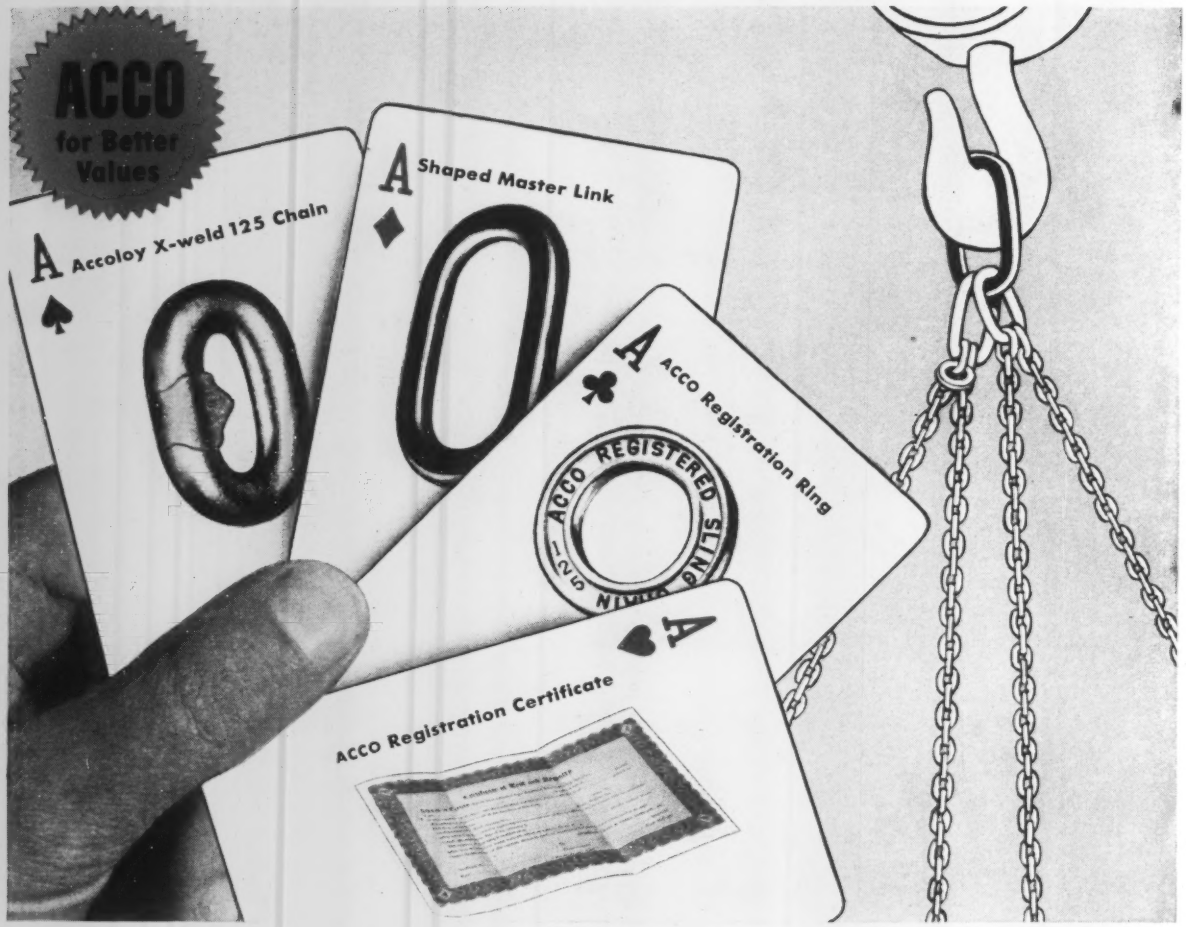

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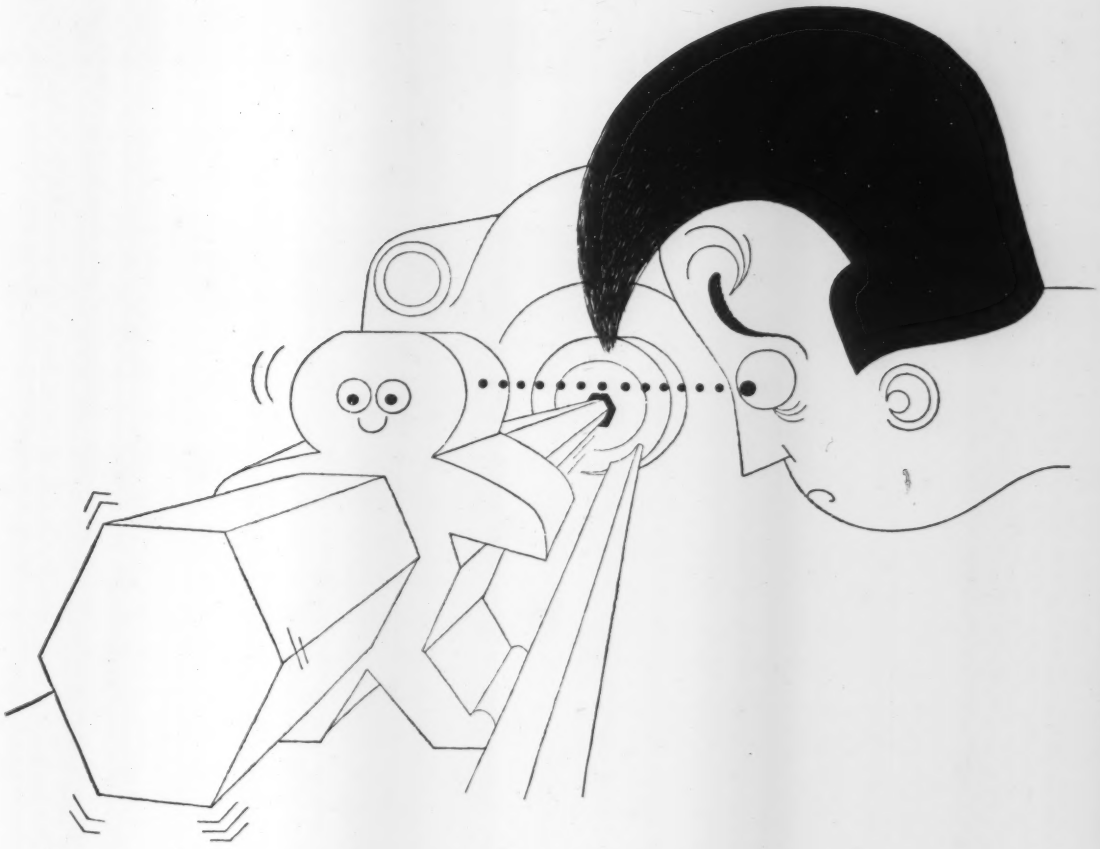

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Make Crucible your regular source for special steels and for helpful advice on their use. For Crucible is the only specialty steel producer *fully integrated to the point of use*. That means control and responsibility from raw material to warehouse delivery to you.

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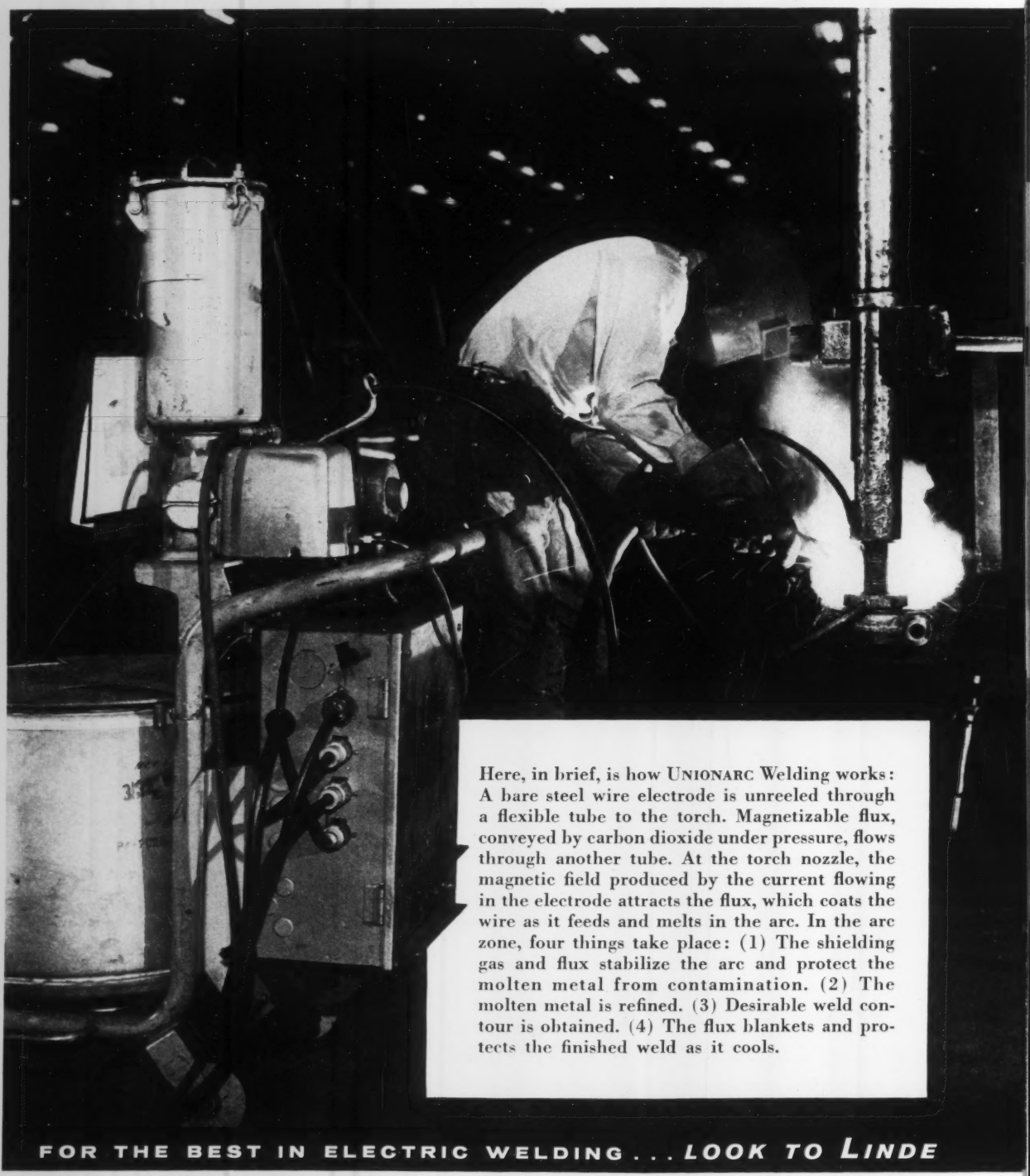
Now... LINDE offers you another UNIONARC Magnetic



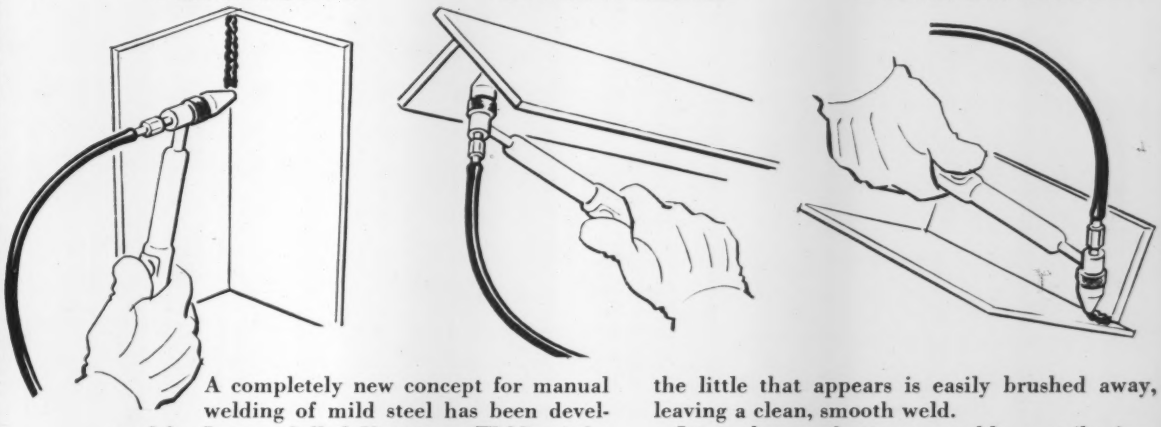
Here, in brief, is how UNIONARC Welding works: A bare steel wire electrode is unreeled through a flexible tube to the torch. Magnetizable flux, conveyed by carbon dioxide under pressure, flows through another tube. At the torch nozzle, the magnetic field produced by the current flowing in the electrode attracts the flux, which coats the wire as it feeds and melts in the arc. In the arc zone, four things take place: (1) The shielding gas and flux stabilize the arc and protect the molten metal from contamination. (2) The molten metal is refined. (3) Desirable weld contour is obtained. (4) The flux blankets and protects the finished weld as it cools.

FOR THE BEST IN ELECTRIC WELDING . . . *LOOK TO LINDE*

modern welding method—
Flux Gas Shielded Arc Welding

UNIONARC *is an entirely new method of welding steel in all manual positions...*

VERTICAL **OVERHEAD** **DOWNHAND**



A completely new concept for manual welding of mild steel has been developed by LINDE. Called UNIONARC Welding, the method uses a continuously-fed bare steel wire electrode, which is magnetically coated with flux and shielded by carbon dioxide. The torch can be easily handled in all welding positions—vertical, overhead, downhand. Manual welds can be made at higher speeds and at lower cost than with covered electrodes. UNIONARC Welding produces high-quality welds in steel, even when moderate amounts of rust, scale, and moisture are present.

Among the numerous advantages of UNIONARC Welding are these: Rate of operation is up to three times faster than with covered electrodes. There is no stopping to renew electrodes, since a single loading of wire can be fed smoothly and continuously for periods up to a week. Manual skill needed is no more than that required with covered electrodes. In vertical and overhead positions, the deposition rate in UNIONARC Welding is two to three times greater than with covered electrode methods; in downhand positions, up to twice as great. There is practically no spatter—the little that appears is easily brushed away, leaving a clean, smooth weld.

LINDE has made many notable contributions to welding. Among these are the introduction and development of submerged arc welding (UNIONMELT Welding), non-consumable electrode, inert gas shielded arc welding (HELIARC Welding), and the development of Sigma (shielded inert gas metal arc) welding. LINDE's newest method, UNIONARC Welding, is another *first*—a truly important contribution. Its simplicity and versatility make it unique. Its efficiency and economy have been proved in actual production work. Write *now* for details about UNIONARC Welding, or call the LINDE office nearest you.

LINDE COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. Offices in other principal cities. *In Canada:* Linde Company, Division of Union Carbide Canada Limited.

The terms "LINDE," "HELIARC," "UNIONMELT," "UNIONARC," and "UNION CARBIDE" are trade marks of Union Carbide Corporation.

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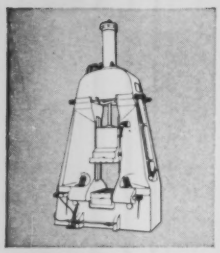

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- Piston-lift • Gravity drop
- Costs less to operate
- Forges more minutes per hour
- Forgings made faster
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Ceco-Drop and Trimmer

• • *for top production*

When the chips are down, it is continuous, trouble-free, quality production that puts you ahead of competition. That fact explains why the Ceco-Drop (in combination with the "indestructible" Chambersburg Trimmer) has become in nine short years, the standard gravity drop hammer of the forging industry.

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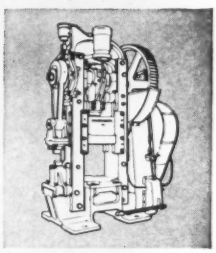

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- FLEXIBILITY
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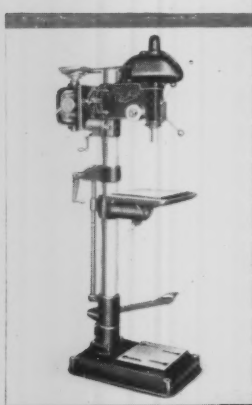

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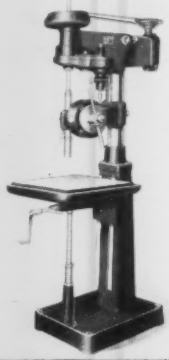

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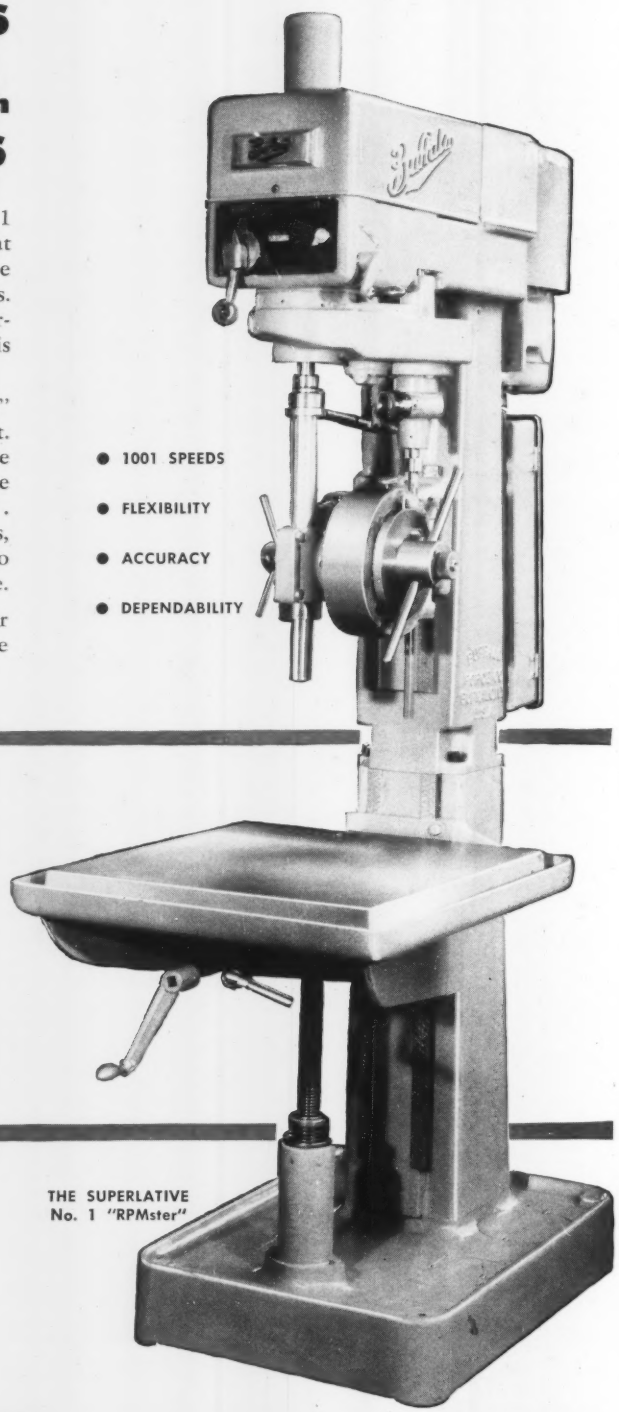

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In 1951, when increased production at Jones & Laughlin's Cleveland plant created a need for greater strip pickling capacity, Wean designed and constructed an 80" continuous strip pickling line which met or exceeded all requirements. In fact, results were so satisfactory that when continually rising production necessitated additional strip pickling facilities, "J & L" again called on Wean to furnish a second line to meet this increased demand.

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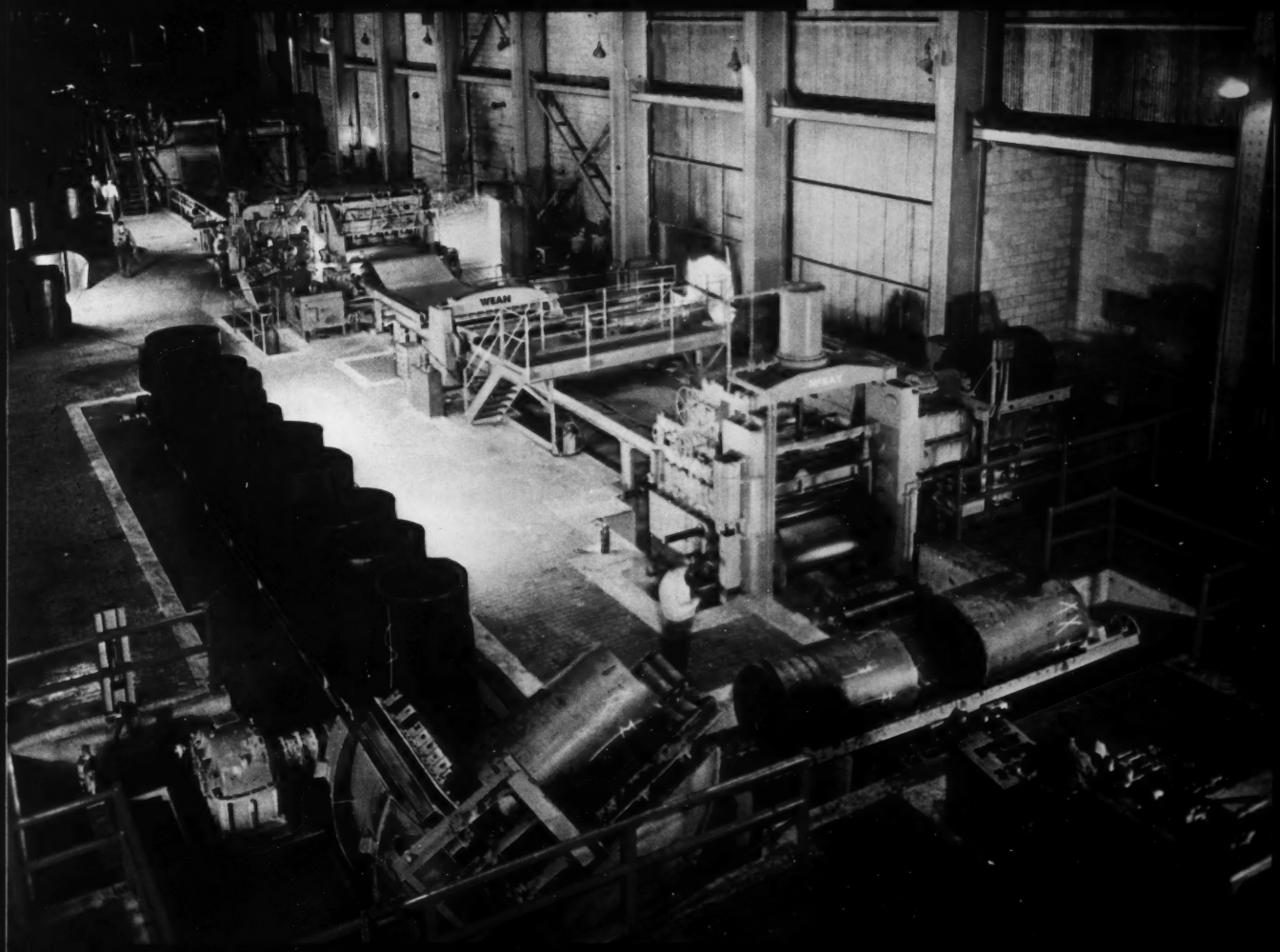

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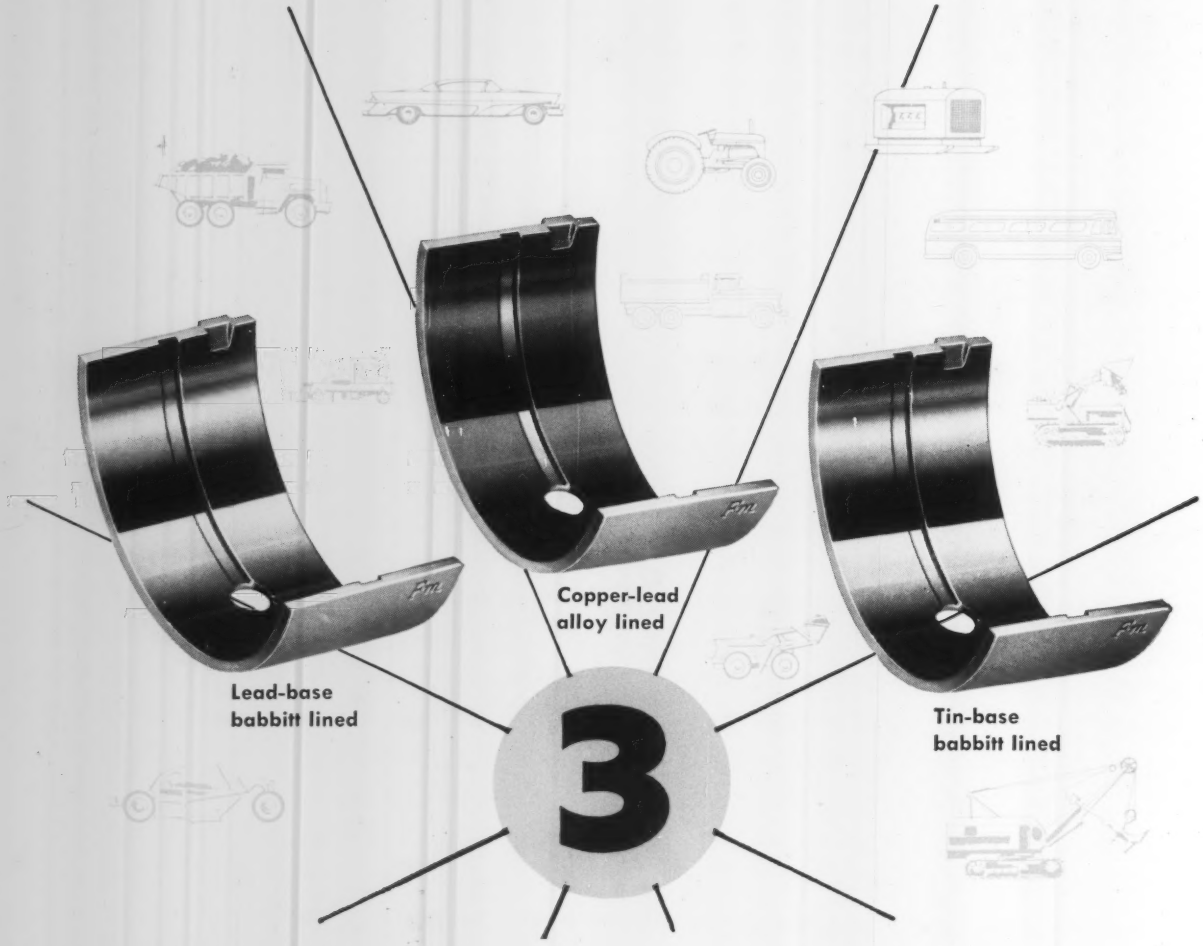
THE WEAN ENGINEERING COMPANY, INC. • WARREN, OHIO



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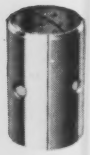
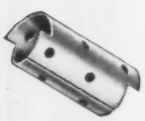


Bimetal Bushings



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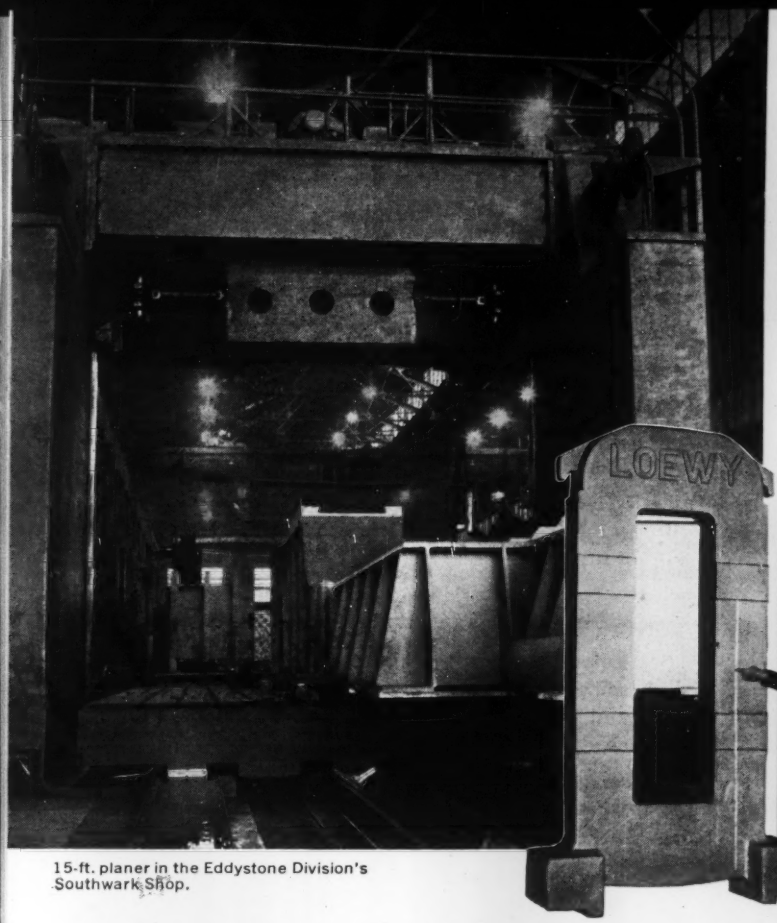

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General Machine Shop at the Eddystone Division, Eddystone Pa., whose 1,500,000 square feet of manufacturing space includes huge fabrication shops and a nonferrous castings foundry.

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Blooming an ingot at the Standard Steel Works Division, Burnham Pa., under one of the 2500-ton hydraulic presses.

Vast, integrated Baldwin-Lima-Hamilton facilities enable Loewy-Hydropress to deliver your rolling mills on time

When Loewy-Hydropress designs and builds your rolling mills, you aren't plagued by the usual troublesome and expensive delivery delay. For Loewy has at its disposal the vast, yet smoothly integrated resources of the entire Baldwin-Lima-Hamilton Corporation.

The two B-L-H divisions called upon most frequently to make parts for Loewy-designed rolling mills are the Standard Steel Works and Eddystone Divisions. The necessary steel components are cast or forged at Standard. And Eddystone, with its extensive machining facilities, supplies the completely finished nonferrous castings and weldments. Other members of the B-L-H family with excellent facilities for producing rolling mill parts are the Hamilton Division, Hamilton, Ohio; the Austin-Western Division, Aurora, Ill.; and the Madsen Division, La Mirada, Calif.

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To your individual production requirements, we design, build and install hot and cold rolling mills for ferrous and nonferrous metals, continuous merchant and wire-rod mills, skelp mills, two-high and three-high blooming mills, high-speed foil mills, continuous billet and sheet-bar mills, strip, slabbing, plate, structural, rail mills, and special mills. Write us today, Dept. B-7, for illustrated bulletin L-164.

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What kept her from falling apart?

The Statue of Liberty was once in danger.

Not from a foreign foe. Not from a crackpot's bomb. This peril was less exciting . . . *but no less destructive.*

It was corrosion — corrosion that had been at work ever since Liberty first raised her torch.

Relentless and merciless in attack, the acrid, smoggy sea air of New York harbor had loosened and weakened the rivets holding the statue's huge sheet metal plates together.

Something had to be done, that was clear. But what? Re-riveting wasn't practical. Too many hard-to-get-at spots in the statue.

The problem was put to an expert — a fastenings manufacturer. His solution: Parker-Kalon® self-tapping screws of Monel* nickel-copper alloy. Monel alloy to keep corrosion at arm's length. And self-tapping screws to pull the plates up snug and tight — from *outside* the statue!

So 65,000 Monel alloy screws were used to "run up the seams" of Miss Liberty's robes. The job was done in 1938 . . . easily . . . neatly. And her worries were over.

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Nickel Alloys Perform Better, Longer

STEEL

July 22, 1957

Metalworking Outlook

Strategy in Steel Labor

The United Steelworkers will try to negotiate about 1200 contracts with metal fabricators this year so that they will expire on or about June 30, 1959. That's the expiration date for basic steel contracts. The strategy is obvious: Get as many as possible of the 1500 steelworker contracts in other than basic steel to expire at or near the time basic steel pacts end. Then, it will be easier for the union to negotiate settlements patterned after the pace-setting steel agreements. The 1200 contracts to be negotiated this year involve about 200,000 of the union's 1.2 million members. Last year, about 300 fabricator contracts were negotiated to end in 1959.

AF Shift: Effect in Missiles

North American Aviation Inc. will lay off 15,600 men because the Air Force canceled further development of its Navaho missile. Immediately involved: $100 million in contracts on hand; $170 million in contracts planned to be let in fiscal 1958. The layoffs will be in four Los Angeles plants. Total spent on the Navaho: $500 million. This is the first of the AF cutbacks indicated by STEEL (see July 1 issue, page 38).

AF Shift: Effect on Lockheed

"We are in a period of reduction throughout the aircraft industry, the full extent of which we do not know yet," notes Courtlandt Gross, president of Lockheed Aircraft Corp., in commenting on AF cutbacks. Lockheed is looking for a civilian market for its C-130 cargo transport. Its new propjet passenger plane, the Electra, will be test flown next February. A new jet utility transport is being offered to the armed forces. Production on it could begin in 1958.

AF Shift: Effect on Electronics

Elmer Engstrom, senior executive vice president, Radio Corp. of America, reports RCA is safe with the new AF look because of its emphasis on electronic systems and apparatus components. A Westinghouse Electric Corp. spokesman says his firm's AF business will increase from 5 per cent of sales in 1957 to 7 per cent in 1958. At least 50 per cent of Westinghouse's aircraft and missile business will continue to be subcontracted. Employment will remain unchanged, although 0.5 per cent of its labor force will be shifted from defense to nondefense work. Burroughs Corp.'s defense sales manager, J. C. Lindley, believes its AF business will hold through 1958 (about 20 per cent of its sales). Some 70 per cent of its aircraft-missile business will be subcontracted.

AF Shift: Effect on Subcontractors

Here's what the AF shift will mean to California subcontractors, according to John Marschalk of the Strategic Industries Association: There will be declining use of independent firms' facilities regardless of government programs to maintain present levels of subcontracting. That's be-

Technical Outlook—p. 99 Market Outlook—p. 135

cause present renegotiation rules pressure the aircraft and missile companies to do a maximum amount of in-plant production to support overhead payroll. SIA executive director adds: "Even though independent firms can probably do a variety of specialized operations below the cost of direct labor in large plants, the dollar saving will be less important than the necessity for complying with minimum ratios of overhead expense to direct labor."

Tool Orders Rising

Look for a report due this week to show machine tool orders rising substantially and shipments climbing slightly in June, compared with May's. The order backlog is holding at about 4.5 months, which is considered satisfactory. New orders had been dropping since February-March although shipments have been holding well. A good bet: New orders will hold steady for the next few months, although shipments may dip in the third quarter because of vacations. Shipments for the year should reach at least $950 million.

What Indicators Show

Ponder these economic indicators: The Federal Reserve Board's industrial production index held steady in June; housing starts dropped. The index stayed at the April and May level, 143 per cent of the 1947-1949 average, on a seasonally adjusted basis. June housing starts slipped to a seasonally adjusted annual rate of 970,000 units. That compares with the annual rate of 980,000 units in May and 1,091,000 in June, 1956.

Rumor of the Week

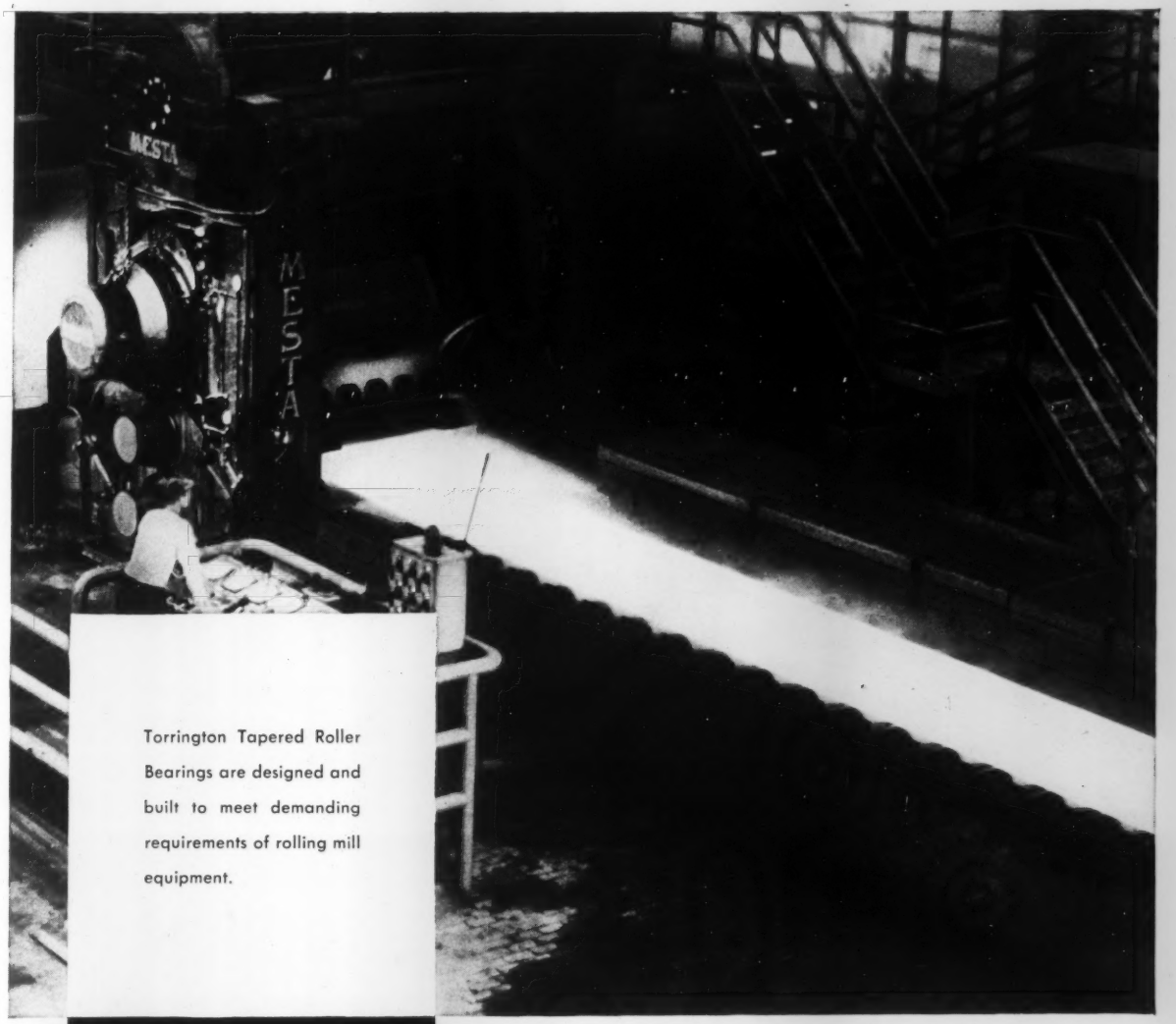
Clarence B. Randall, retired president of Inland Steel Co., may become the next secretary of defense. He reportedly was weighing an offer last week to succeed the present secretary, Charles Wilson, who wants to leave the Pentagon. The rumor makes some sense because Mr. Randall has done a number of jobs for the White House already, notably chairmanning a committee to study the nation's foreign trade policies.

Gains for Foremen

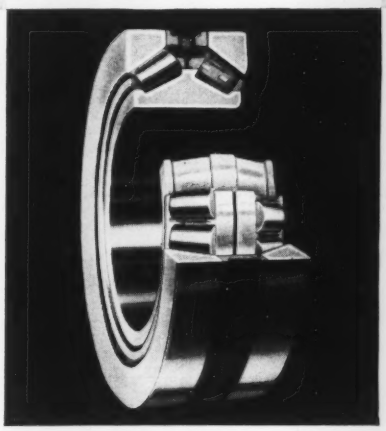
The foreman is coming up in the world. The National Foremen's Institute reports that only 17 per cent of the firms it surveyed require the supervisors to punch a time clock, compared with 39 per cent in 1953. Now 97 per cent of the respondents have foremen participate in management meetings, compared with 87 per cent in 1953. Now 95 per cent have foreman training courses, compared with less than half in 1953.

Straws in the Wind

The U.S. courts will let Carpenter Steel Co. keep secret the specifics about its plans for Northeastern Steel Corp.; it needs court approval to acquire the bankrupt firm . . . Union Carbide Corp. has 30 days to answer the Federal Trade Commission charge that it violated the antimerger law by acquiring Visking Corp., Chicago . . . General Motors Corp.'s engineering staff has jumped from 800 in 1940 to 5700 now . . . Natural gas companies had $3 billion in revenue last year.



Torrington Tapered Roller Bearings are designed and built to meet demanding requirements of rolling mill equipment.



Meeting Production Demands!

Today's heavy production demands on modern continuous hot and cold strip mills put back-up roll thrust bearings to severe test.

That's why you find so many Torrington Two-Row Tapered Roller Bearings in this service throughout the country. Operators have learned that they can rely on Torrington Bearings to roll out record tonnages with only routine maintenance.

Little wonder—steep-angle design gives them capacity to spare for handling heavy thrust loads. Only highest quality electric furnace, alloy-bearing steel is used, carburized and heat-treated for toughness, hardness, stability and uniformity. Precision workmanship assures even load distribution and minimum friction.

Torrington Two-Row Tapered Roller Bearings are available with either pin-type or cast-bronze, land-riding cages. Like Torrington Four-Row Tapered Roller Bearings and Spherical Roller Bearings, they offer performance you can rely on when production schedules demand the best. **The Torrington Company, South Bend 21, Ind.—and Torrington, Conn.**

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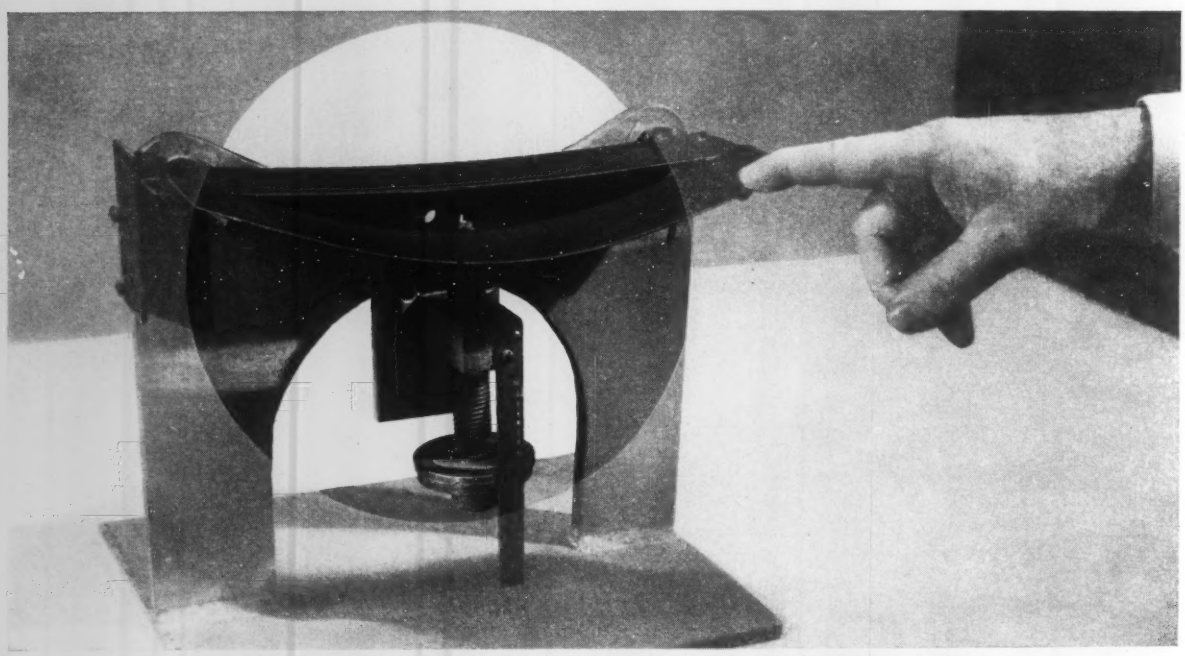
How Armco Enameling Iron Helps Parts Hold Tolerances ...assures tight porcelain enamel-to-metal bond



Fired at the same temperature: Armco Enameling Iron (back) resists sag; Plain steel (front) sags badly.

Armco Enameling Iron stubbornly withstands sag and distortion at all porcelain enamel firing temperatures. Dimensions stay accurate. Porcelain enameled parts fit. Rejects are practically eliminated.

But that's not the whole story about this special enameling iron. Product parts also have a tighter, more durable, enamel-to-metal bond. Microscopic projections on the surface of Armco Enameling Iron are the reason. These little metal "fingers" that are formed during firing take and hold the porcelain enamel finish in a tenacious grip. And, because this special enameling base contains a minimum of gas-forming impurities, perfect finish is easier to achieve.

Designed for One Job

Unlike many metals used for this purpose, Armco Enameling Iron is made *only* for porcelain enameling. That's why so many producers of high quality porcelain enameled products have specified this specially-processed enameling metal for more than 40 years.

For complete information, just fill in and mail the coupon for a copy of the catalog, "Armco Enameling Iron."

Tiny projections formed during firing on the surface of Armco Enameling Iron (above) are only about .000125-inch high. Although of microscopic size, they hold the finish in a tight grasp.

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The Right To Manage

Management's right to manage is imperiled by the continuing encroachments of labor.

In the 1920s, management could deal freely with its workers on an individual basis. It had the option of refusing to negotiate with labor unions that did not adequately represent its employees.

Then the New Deal 1930s brought the Wagner act. Under it, management was obliged to bargain collectively with the union representing the majority of its workers. This meant the international union in most cases, not simply the company local.

In more recent years, international unions found they could move from the discussion of wage rates and working conditions into compulsory bargaining on a never-ending list of fringe benefits.

At the bargaining table today, unions with monopolistic powers can virtually hammer management into submission on contract provisions that would have been considered fanciful dreams even by union leaders only a few years ago.

Supplemental Unemployment Benefits, jury pay, wage rates tied to the consumer price index and long term contracts are examples.

With longer term contracts, more of the differences between management and labor are going to arbitration. This year's 15,000 arbitration cases will be 5 to 10 per cent greater than the number heard in 1956. The trend will continue upward as more companies sign multiyear contracts.

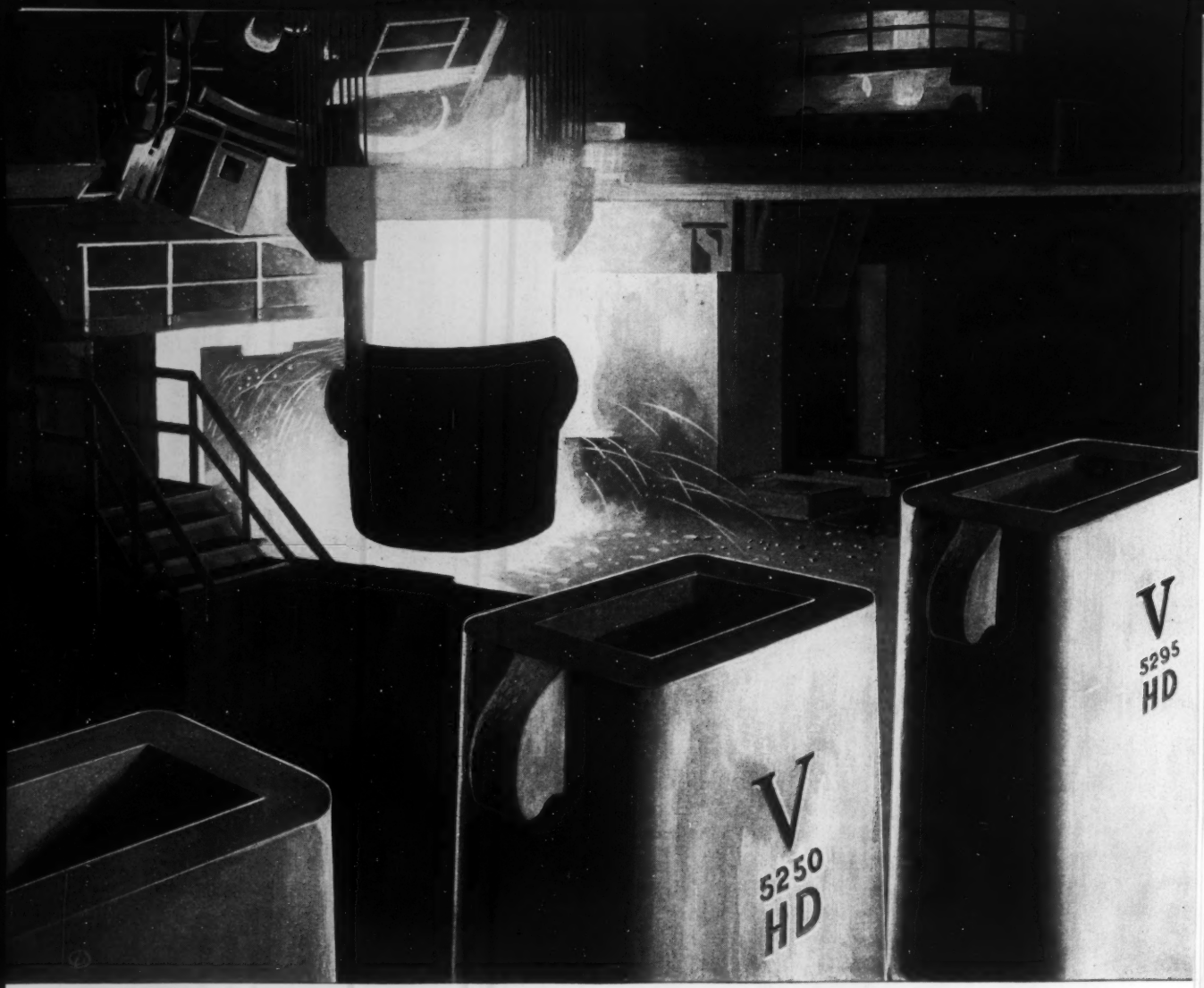
In the future, arbitration conceivably could evolve into the European system of co-determination. Under it, corporations are run by a board which has equal representation from management and labor, plus a neutral arbitrator.

The growing power of unions has profoundly affected products, production, marketing, prices, profits and the public.

Union leadership is in a position where it could quickly step in to assume functions which are properly those of management charged with the responsibility of running a business on behalf of its owners.

We believe that management must take a more forceful position in establishing its right to manage, especially through stronger management-rights clauses in labor contracts.

Irwin H. Such
EDITOR-IN-CHIEF



All ingot moulds by Valley are designed for individual steel plant conditions. These moulds have been proven the highest quality available to the steel producing industry today.

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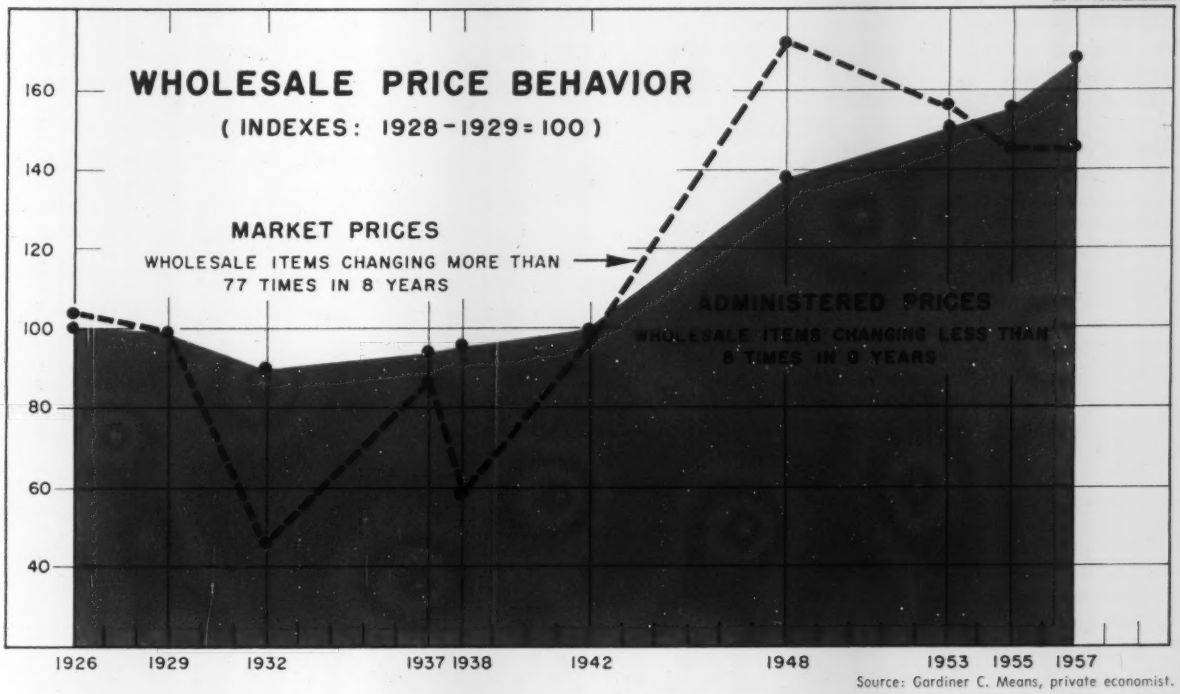


Source: Gardiner C. Means, private economist.

Steel Takes Witness Chair

Senator Kefauver wants to show the steel price hike as needlessly inflationary. He'll hit "administered" prices, a practice that has strong advocates

SPOKESMEN for the steel industry will have their day in court before the Antitrust & Monopoly Subcommittee in the next 30 days.

If they follow the line prepared for them by private economists, they should be able to discount to a great extent the charge that the $6 price boost set by U.S. Steel Corp. is needlessly inflationary.

Price Fixing?—Under the guise of investigating "administered" prices, Sen. Estes Kefauver's (Dem., Tenn.) subcommittee is out to hang the steel industry for rising inflation.

The chart above illustrates the senator's concept. In the last couple of years, administered prices (those that change only about once a year) have risen above market prices (those that usually change every month). But the economist who prepared the chart, Gardiner C. Means, points out that in the past, administered prices have run behind market prices, holding inflation back. Implicit in Mr. Means's testimony before the Kefauver subcommittee: In the future, administered prices could again be held below market prices.

Wage Fixing?—Add to that another economist's idea: Edwin G. Nourse told the senators that wages, as increased by union efforts, are just as "administered" as prices (STEEL, July 15, p. 60).

Wages and prices are by nature as deflationary or inflationary as you make them, according to that theory.

Free Market—In the middle you have the few industries in the country which are truly free to move with the constantly changing levels of supply and demand: Metal scrap, textiles and food. In times such as these, they are being hurt the most, says Mr. Means.

Richard Ruggles, Yale economist, and the third expert to appear at the hearings, follows Mr. Means and Mr. Nourse, but adds: "Even if all the administered price industries charged what could be regarded as a fair price, we would still have rising prices with us as long as productivity fails to rise enough to keep up with wage prices."

Steel's Answer—So top steel executives (probably U.S. Steel's Roger Blough for one) should be able to pick up the ball when they testify. Price boosts are needed to pay for wage increases and new plants.

With Mr. Means's chart, they should also be able to show that the steel industry can act to hold back inflation. If steel had gone up $12 as some suggested, the industry's case before the American

public would be weaker, even though still logical.

Like the Utilities?—Only once at the hearings have the senators faced up to the biggest question of American economics: Should industry be made to operate like the utilities, with government approval for rate changes? Economist John Galbraith answered that one. "Any remedy," he noted, "for administered prices has been postponed by those who chase the will-o'-the-wisp of a complete remedy." Furthermore, he said: "Price leadership is inevitable" in industries with a small number of companies or industries dominated by major firms.

Electronics Booming in West

The electronics industry is thriving on the West Coast. At the end of '56 it could boast that it had 15 per cent of the nation's electronic firms, 17 per cent of its employment and 24 per cent of its sales, states Calvin K. Townsend, president, West Coast Electronics Manufacturers Association.

A WCEMA survey found 470 electronics firms in the Los Angeles area. They employ 73,000, have an annual payroll of over $300 million and sales of $1 billion.

Expansion of facilities, rather than new plant development, appears to be the growth pattern this year. Firms in the San Francisco area expect to increase their plant facilities by about 50 per cent this year.

R. T. Silberman, San Diego council chairman, states that the San Diego area is the "center of gravity" for a growing number of military projects. Reason: Subcontracting activity for nearby Convair, Stromberg-Carlson and General Atomic (all divisions of General Dynamics Corp.), Ryan Aeronautical Co. and the Navy Electronics Laboratory.

Merger Rate Holds Steady

Mergers reached a total of 462 during the first half, compared with 466 for the same period in 1956 and 404 for the same 1955 period, reports the Federal Trade Commission.

Dr. Simon N. Whitney, director of FTC's Bureau of Economics, said the information was obtained from press announcements. The purpose was to determine what the trend is.

No investigations were made, he said.

Boost for Steel Castings

The Office of Defense Mobilization, during a two-week period ended June 25, allowed 26 more firms to write off a percentage of their investments in facilities for defense purposes.

Face value of the certificates was over $54 million. Of that amount, over $12 million was allowed under the steel castings goal. Companies in this category were: General Electric Co., Schenectady, N.Y.; American Brake Shoe Co., Leroy, N.Y.; American Brake Shoe Co., Chicago Heights, Ill.; Consolidated Foundries & Mfg. Co., Muskegon and Detroit, Mich.; Pacific Alloy Engineering Corp., El Cajon, Calif.; and Consolidated Foundries & Mfg. Corp., Chicago.

Companies receiving certificates under other goals included: Pratt & Whitney Aircraft Division, United Aircraft Corp., East Hartford, Conn., 75 per cent of $4.7 million for jet engines; World Wide Tankers Inc., New York, 40 per cent of $12.5 million for oil tanker; Ramo-Wooldridge Corp., Los Angeles, 40 per cent of $13.4 million for research and development; Aluminum Co. of America, Vernon, Calif., 65 per cent of $4.3 million for aluminum extrusion facilities for military aircraft; and General Electric Co., Evendale, O., 80 per cent of $3.9 million for military aircraft engines.

Heavy Shapes, Plates Ease

SUPPLY of heavy structural shapes and steel plates has about caught up with national demand, says American Institute of Steel Construction.

Mill shipments of heavy shapes will approximate 6,600,000 tons this year, up 24 per cent from last year's 5,349,000 tons. Plate shipments will reach 9,400,000 tons, surpassing last year's 7,715,000 tons by 22 per cent. Further increases are expected in 1958.

L. Abbett Post, AISC executive vice president, reports that fabricators throughout the country are obtaining increased mill shipments. In some instances, there are shortages of specific sizes.

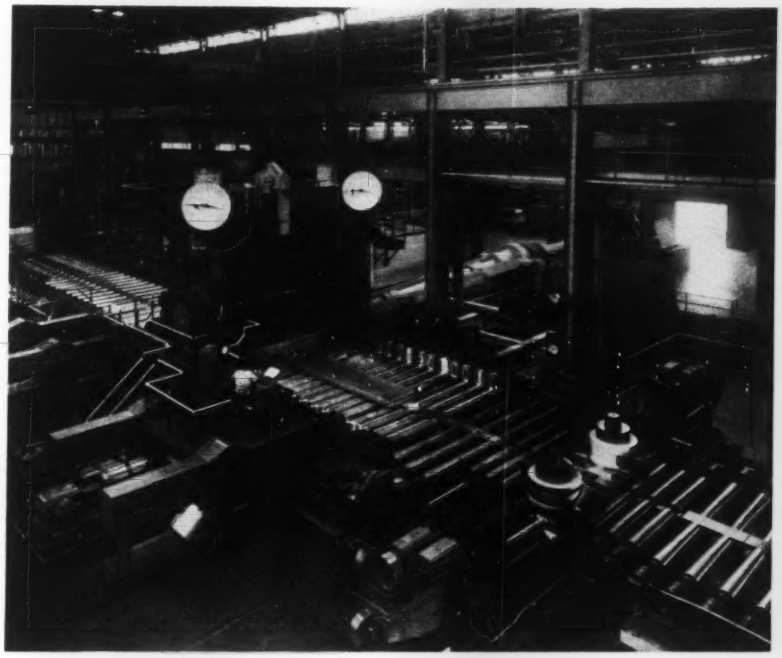
The industry anticipates no difficulty in supplying structural steel for the federal highway program or for other industrial and commercial construction, since fabricating facilities are more than adequate.

STRUCTURAL SHIPMENTS GAIN

(Net tons)

Year	Heavy Shapes	Plates
1958*	6,700,000	9,700,000
1957*	6,600,000	9,400,000
1956	5,349,000	7,715,000
1955	4,737,000	6,762,000
1954	4,501,000	5,340,000

*Estimated.
Source: American Institute of Steel Construction Inc.



This 160-in. hot mill is one of ten new facilities as . . .

Alcoa Expands at Davenport

ALUMINUM Co. of America has completed a two-year, $54-million expansion program at its Davenport, Iowa, aluminum rolling mill.

New production units include:

- A 160-in. hot mill, said to be the widest in the industry. It cost more than $7 million.
- A 100-in. cold mill for the finish rolling of wide, coiled aluminum sheets.
- A $13-million foil rolling facility, with an annual capacity of 24 million lb. (The six-acre operation will produce foil in 10,000-ft coils.)
- A plate stretcher with a pulling force of 16 million lb (operated by Alcoa for the Air Force).
- Two plate treating and aging furnaces which can accommodate plates up to 60 ft long and 13 ft wide.
- Three strip shears.
- A 100-in. wide resquaring shear (to be installed) that trims both edges and both ends of a plate at the same time.

Additions to the $130-million plant double its rated capacity: Now 36 million lb a month, with an emergency expansion potential of 10 million lb.

New plant facilities cover 20 acres, bringing the floor area under one roof to 72 acres. The plant employs 2200. Its potential is 3000. Capital investment per employee is pegged at $45,000.

E. B. Fassel, Alcoa's Davenport works manager, said the new facilities will be able to produce plates up to 6 in. thick, 12 ft wide and 60 ft long.

Although demand for aluminum is off currently, Alcoa officials are optimistic about selling the additional capacity. Proof: While most facilities now operate at only 70 per cent of capacity, the company plans to increase its production by 50 per cent.

Says one Alcoa official: "We can't expect our new production to be entirely taken up by population increases, although this will help. We'll have to go out and find new uses for our products."

The most promising field for expansion is the building industry, Alcoa believes. The average home today uses 25 to 30 lb of aluminum —sales executives think this figure coud be increased to 1500-2500 lb. Other growth areas: Automotive, pleasure craft, shipbuilding, cans and containers.

Fastener Maker Expands

Pittsburgh Screw & Bolt Corp., Pittsburgh, has completed financing arrangements for the construction of a $6-million fastener plant in the Mt. Pleasant-Scottdale area near Pittsburgh. Occupancy is planned for early 1958. The plant will have an area of about 600,000 sq ft.

Westinghouse Builds In South

Westinghouse Electric Corp., Pittsburgh, will build a manufacturing and repair plant in Charlotte, N. C. Completion is scheduled for mid-1958.

The 24,000 sq-ft plant will be equipped with a 25-ton crane. It will do repair work on heavy industrial and utility equipment.

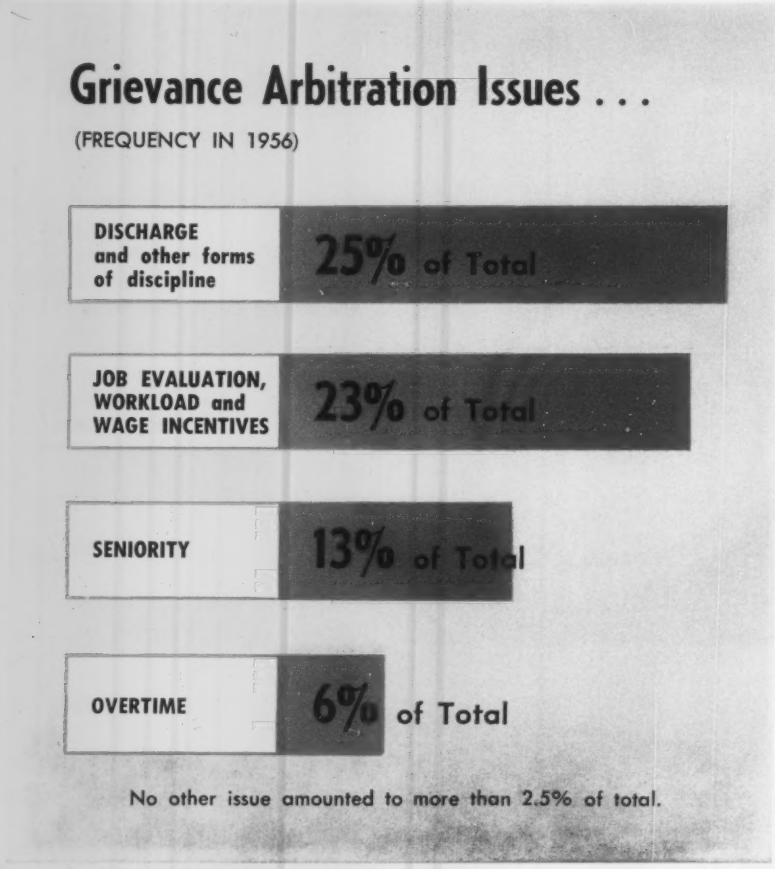
Sylcor To Build In New York

Sylvania-Corning Nuclear Corp., Bayside, N.Y., broke ground for a plant at Hicksville, N.Y., which will manufacture nuclear fuel elements for atomic reactors.

The 25,000 sq-ft building will double the company's Hicksville facilities. John C. Robinson, who will manage the plant, said it will be completed early next year. Employment will be about 125.

Plant Opened In Texas

Garrett Oil Tools Inc., Longview, Tex., division of U.S. Industries Inc., New York, opened a new plant in Longview. The 86,000 sq-ft plant will produce gas lift valves and other oil field equipment.


Grievance Arbitration Issues . . .
(FREQUENCY IN 1956)
DISCHARGE and other forms of discipline
25% of Total
JOB EVALUATION, WORKLOAD and WAGE INCENTIVES
23% of Total
SENIORITY
13% of Total
OVERTIME
6% of Total
No other issue amounted to more than 2.5% of total.

Source: American Arbitration Association.

Trend Up in Arbitration

BRACE YOURSELF. Industry must fight 5 to 10 per cent more labor arbitration cases this year than last. And the steady increase in the case load promises to continue for the next several years, pushing the total far beyond the estimated 15,000 that will be filed in 1957.

The American Arbitration Association, New York, reports a 7 per cent increase in 1956 over 1955. Management generally dislikes to go to arbitration, although it initiates some of the proceedings. The overwhelming majority of cases are started by the union.

Why—Arbitration is more and more popular with labor largely because of the long term contract. With contract negotiations coming up less frequently, campaign opportunities in internal union politics are not so numerous. Labor's politicians are creating more occasions to demonstrate their merits to the membership by going to arbitration. The long term contract also means that both sides have less frequent chances to clarify ambiguities in contract language. They are more apt to go to arbitration to get a decision.

Management generally is reluctant to go to arbitration because of the opportunities for union politicking, because of the expense in time and money and because of the danger that an arbitrator will subtract from, add to or amend the contract.

Reducing the Load—Remember that arbitration is usually the fourth or fifth step in the grievance procedure. The arbitration case load can be cut by taking greater advantage of the three or four chances you get to settle grievances before arbitration is necessary.

There are many ways to do a better job handling grievances, but three are sure-fire:

1. Make your contract language so clear and precise that squabbles over interpretation are at a minimum.

2. Prepare your grievance arguments carefully, complete with records and other supporting data.

3. Train your foremen and other immediate supervisors in the grievance procedures and in the necessity for good daily records.

Processing a grievance in the first two or three steps costs $10 to $80, but once you go to arbitration, the expense jumps to $400-$800.

If You Must Arbitrate—But sometimes you can't settle without arbitration. The union refuses to compromise. Or your compromise would weaken your position in future grievances. Or there is an ambiguity in the contract that must be clarified.

Under such circumstances, personnel experts advise: Go in to win.

Management's won-lost record is not impressive. It was sustained in only 46 per cent of several hundred recent discharge cases, the most common type of dispute.

Step One—Needed first is a good arbitration clause. The AAA recommends: "Any dispute, claim or grievance arising out of or relating to the interpretation or application of this agreement shall be submitted to arbitration under the Voluntary Labor Arbitration Rules of the American Arbitration Association. The parties further agree to accept the arbitrator's award as final and binding upon them."

Some industry men think the wording too broad. They would try to reduce the danger of the arbitrator's changing the contract by inserting a phrase prohibiting him from "subtracting from, adding to or amending the contract." Some also would like more precise

wording on what is arbitrable. Management and labor usually agree that wages always should be excluded.

Step Two—The next important move is selecting the arbitrator. The AAA has a panel—40 per cent are lawyers; 40 per cent, educators; and 20 per cent clergymen, consultants or in similar professions. The Federal Mediation & Conciliation Service has a list, as do agencies in many of the 16 states which have arbitration statutes.

Study decisions of five or so arbitrators you pick from any of those panels. Check employers' associations, such as the Associated Industries of Cleveland or the Employers Association of Detroit, for their views on your candidates. Then see if you can get the union to agree on any of three or so you settle on. In 98 per cent of the cases, management and labor are able to agree upon an arbitrator. If no agreement can be reached, AAA or some other impartial group will select one to handle the case.

The first two steps should be done far in advance of any arbitration case. Then you'll be ready for the third move, initiation of arbitration. Either party usually can start proceedings. Management doesn't often do it—a mistake, according to some arbitrators, such as George F. Hayes, Cleveland attorney. He says: "Management tends to make too many concessions in the early steps of the grievance procedure. If it had stuck to its guns and gone to arbitration, it might have won its point, strengthened the contract and improved its position."

Step Three—If you are subject to an arbitration clause (most metalworking contracts have it) and are going to initiate proceedings, all that's needed is a letter to the union stating your intention and this information:

1. Names and addresses of both parties involved.
2. Date of the collective bargaining agreement and the full text of the arbitration clause.
3. The issue to be arbitrated, specifically and concisely-stated, with an indication of the relief sought.
4. All dates involved in the grievance.
5. Names of employees involved, with their positions.

If you are going to use the AAA for clerical and administrative purposes, send a copy to it.

Step Four—By the time a case reaches arbitration, parties have generally spent weeks, if not months, discussing the grievance. The problem now is to communicate your understanding of the facts to the arbitrator, who, as a rule, knows nothing about the dispute until the hearing begins. Effective presentation of the facts and arguments should begin with thorough preparation for arbitration. AAA suggests:

1. Study the original statement of the grievance, and review its history through every step of the grievance machinery.
2. Examine carefully the initiating papers to determine the authority of the arbitrator. It might be found, for instance, that the original grievance contains elements which the arbitrator, under the contract, cannot adjudicate.
3. Review the collective bargaining agreement from beginning to end. Often, clauses which at first seem to be unrelated to the grievance will be found to have some bearing on it.
4. Assemble all documents you will need at the hearing.
5. Make plans for the arbitrator to visit the plant if you think that will be necessary.
6. Interview all witnesses. Be sure they understand the whole case and the importance of their testimony in it.
7. Make a written summary of what each witness will prove.
8. Study the case from the other side's viewpoint. Be prepared to

Common Errors in Arbitration

1. Overemphasis and exaggeration of the grievance.
2. Reliance on a minimum of facts and a maximum of arguments.
3. Using arguments when witnesses or exhibits would better establish the facts.
4. Concealing essential facts; distorting the truth.
5. Holding back books, records and other supporting documents.
6. Tying up proceedings with legal technicalities.
7. Introducing witnesses who have not been properly instructed on demeanor and on the place their testimony has in the case.
8. Withholding full co-operation from the arbitrator.
9. Disregarding the ordinary rules of courtesy and decorum.
10. Becoming involved in arguments with the other side. The time to try to convince the other party was before arbitration, during grievance processing. At the arbitration hearing, all efforts should be concentrated on convincing the arbitrator.

answer the opposing evidence and arguments.

9. Discuss your case with others in your organization. A fresh viewpoint may disclose weak spots or previously overlooked details.

10. Read as many articles and published awards on the subject in dispute as you can. While awards by other arbitrators for other cases have no precedent value, they may help the thinking of all concerned.

Step Five—Now comes the payoff, presentation of the case before the arbitrator, who usually fixes the date for hearings after consulting both parties. Customarily, the complaining party proceeds first with arguments and proof, but the arbitrator may vary the order if he wishes. AAA suggests that each party approaching arbitration should have ready:

1. An opening statement in writing for submission to the arbitrator which clearly and briefly describes the dispute and indicates what he will prove. The statement should also discuss the remedy sought.

2. Names of all witnesses in the order in which they will be called, together with a list of the points they are to cover.

3. A list of exhibits in the order in which they will be introduced and a notation of what each is to establish.

4. A closing statement. This should be a summation of evidence and arguments and a refutation of what the other side has brought out.

The arbitrator will come out with his award within 30 days, and his decision will be binding. His award can profoundly affect your labor relations. Chances are he'll be making more and more over the next few years.

L. Clayton Hill, an arbitrator and professor at the University of Michigan, thinks we "could be in danger of arbitrating ourselves into poorer labor relations." He and others believe both management and labor should do a better job of picking arbitrators, preparing for hearings and presenting cases.

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* *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Plants Adopt Medical Tools

Manufacturers discover that stomach probes can be used to inspect tight corners. Eder Instrument Co. modifies its products to the needs of industrial users

ESTABLISHED in 1943 to make medical and surgical instruments, Eder Instrument Co., Chicago, now makes most of its products for industry.

Manufacturers have discovered that Eder's modified gastroscopes, esophagoscopes and other diagnostic probes make excellent tools for inspecting the tight corners of their assemblies. They account for 64 per cent of the firm's sales.

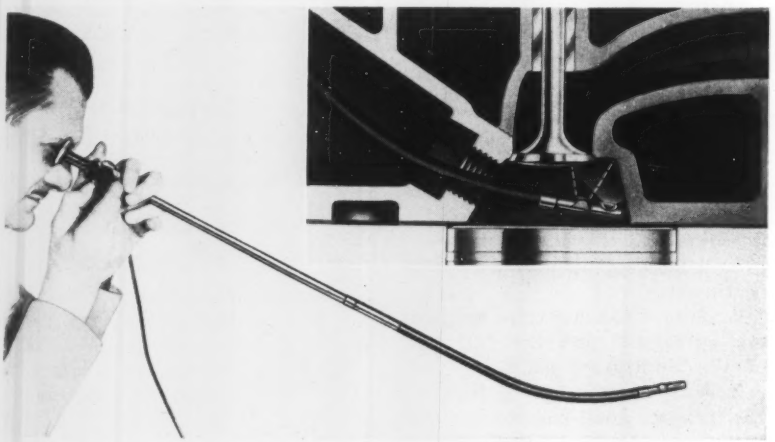
Not until 1955 did the industrial demand for optical inspection instruments develop. Eder met this need by making an inspectroscope out of its gastroscope, an instrument developed previously for examination of the stomach.

The Tool—The basic unit is a miniature transformer in a cylindrical handle that fits into the palm of the hand. Slender extensions of various lengths, rigid or flexible, are screwed into the transformer. A tiny tungsten bulb is threaded to fit into the extension. Using extensions and bulbs, the lighting unit needed for a specific job can be assembled.

Mirrors provide vision and illumination around corners and through holes, such as spark plug openings in engines. One model only $\frac{1}{8}$-in. in diameter, will pour light into a tiny crevice. Ten-power magnification is provided for precision work. By bending the inspectroscope's tip, it is possible to inspect areas which could not be seen even with mirrors or prisms. Most of the 47 lenses in the instrument are used to transmit images to the eye when the tip is bent. Visualization is possible from a straight position through a radius of 50 degrees.

Where It's Used—Use of the inspectroscope permits examination of pockets, corners, joints and moving parts which would be inaccessible by other means. Air vents, aircraft assemblies and retractable landing gear with concealed movements can be inspected easily. Engineers and maintenance men find the device helpful in examining gasoline, diesel and jet engines, cylinder heads, valves and welded containers. Other users: Ordnance inspectors; manufacturers of automatic transmissions, tractor assemblies and gears; makers of radio and television receivers.

When inspectroscopes are used to check atomic stockpiles, they soon become radioactive. Since they cost from $400 to $700 each, it's impractical to keep them out of service until they're decontaminated. The problem is solved



This inspectroscope, a modified surgical tool, permits views into hidden recesses

Liberian Veep Hails Republic Iron Ore Development

DEVELOPMENT of the high grade ore deposits (69 to 70 per cent Fe) by the Liberian American Co. (owned jointly by Republic Steel Corp. and the government of Liberia) is giving the small African republic a tremendous economic boost, says its vice president, William R. Tolbert Jr.

During his recent tour of the U.S., Mr. Tolbert visited Charles M. White, Republic's chairman, at the corporation's home office in Cleveland. Production from the 30-million ton deposit has increased steadily since operations began four years ago. It hit 2 million tons in 1956.

Mr. Tolbert says new roads, new schools and improved sanitation are direct results of revenues the government receives from the ore.

Left to right, Charles M. White, chairman, Republic Steel Corp.; George A. Padmore, Liberian ambassador to U.S.; William R. Tolbert Jr., vice president of Liberia

at nominal cost by using straight disposable rods and mirrors with the five-power telescope, since neither lamp nor lenses are required in this application.

The instrument is also used to inspect jet engine fuel lines where metal and rubber are joined. These passages are frequently blocked by rubber particles. Inspection before starting the engines now eliminates costly breakdowns. Laboratories find the inspectroscope helpful in locating clogged parts of centrifuges. Every time disassembly of a centrifuge is avoided, $140 is saved.

Company Is Small — Eder's switch in production emphasis was taken in stride, without outside counsel, says Ludwig Streifeneder, president. The company has only 12 employees. Operations are flexible. It makes most of its parts, machining them from brass, aluminum and thin-walled stainless steel tubing. New uses for inspectroscopes are usually developed through company efforts to solve a customer's problem. Since few inspectroscope parts are stock items, Eder sees no advantage in trying to establish a national dealer organization.

Europe Hikes Steel Output

STEEL production in Western Europe this year continues to rise over last year's annual rate. The information comes from the United Nations Economic Commission for Europe in Geneva, Switzerland (see table).

First quarter comparisons (1957 vs. 1956) show Western Germany up 5 per cent; United Kingdom, 2 per cent; France, 7 per cent; Belgium, 5 per cent; Italy, 20 per cent; Poland, 10 per cent; Luxembourg, 5 per cent; Saar, 6 per cent.

Current data on the USSR and its satellites, other main producing areas, are unavailable.

EUROPEAN STEEL PRODUCTION

(Annual rate in thousands of net tons)

Country	1956 Total	1957 Jan.	1957 Feb.	1957 Mar.	1957 Apr.	1957 Avg Rate*
Western Germany	25,507.9	27,126	25,330.8	27,112.8	25,449.6	26,254.8
United Kingdom	23,090.1	24,172.5	25,110.8	25,013.6	24,732.4	24,757.4
France	14,738.9	15,853.2	14,440.8	15,958.8	14,440.8	15,173.4
Belgium	7,012.5	7,590	6,850.8	7,550.4	7,194	7,295.1
Italy	6,498.8	7,378.8	6,705.6	7,418.4	7,180.8	7,170.9
Poland	5,515.4	5,636.4	5,570.4	6,322.8	5,843.2	5,800
Luxembourg	3,801.6	3,973.2	3,682.8	3,907.2	3,854.4	3,854.4
Saar	3,711.4	3,907.2	3,682.8	3,960	3,564	3,773.5
Sweden	2,667.5	2,659.8	3,003.1			
Austria	2,285.8	2,785.2	2,653.2			
Netherlands	1,146.2	1,399.2	1,188	1,346.4	1,161.6	1,274.3
Yugoslavia	973.5	1,003.2	1,042.8			

Source: United Nations Economic Commission for Europe. *Based on first four months.

Coast Group Dares IAM Lawyers

THE CALIFORNIA Metal Trades Association may soon find itself well on the way to fighting one of the most important legal battles in American labor history. The association is the bargaining agent for 160 small metalworking firms in the San Francisco-Oakland area—130 of the companies are shut down over a sick leave-wage dispute with the International Association of Machinists. The IAM originally struck only nine of the firms; the others closed to back up the CMTA's stand against the union.

Precedent for the shutdown, says CMTA: The Buffalo Linen case where the Supreme Court ruled multiemployer associations could close as a defense against some of their members being struck. Around Washington, good legal opinion has it that the Buffalo case is of a special nature.

Is CMTA a Special Case?

Washington sources note that not all association members have shut down. That shows lack of agreement within the group: It could leave the individual members open to any action the IAM may decide to bring. Another special circumstance: While CMTA represents 160 companies in dealing with the IAM, it also sets the wage and benefit patterns for many other firms in the area. Indeed, some contracts between IAM and nonassociation members contain clauses that the CMTA pattern will govern. About 20,000 IAM members are affected through this means, not just the 8300 working in the 130 firms which have closed.

SBA May Miss Its Boat

With the Senate haggling over civil rights, the Small Business Administration may lose its bid to become a permanent agency. The House has voted approval, but the Senate Banking & Currency Committee has reported out a bill which only extends the life of the agency for another year past its July 31st deadline.

Chances are the Senate will O.K. that and won't take the time to debate SBA's permanent status.

U.S. Gives Away Your Secrets

George Hannaum, director, Industry Planning Service, Aircraft Industries Association, is worried about technical and manufacturing data requirement clauses in procurement contracts from the Defense department. The contracts, he says: "Virtually give the government the right to furnish all other firms the know-how laboriously acquired by a competitive company."

Defense's position may stifle initiative, says Mr. Hannaum. His recommendations as to when data should be released to the government:

1. The originating company should maintain its rights to the information in nongovernment fields.
2. The government should compensate the originating company for the information.

How To Get R&D Contracts

Sen. George Smathers' (Dem., Fla.) Military Procurement Subcommittee heard testimony on small business' share of Navy procurement dollars. Research and development is one weak spot that needs tightening up, thinks Senator Smathers.

Small firms which have never done R&D work before have little, if any, chance of getting an R&D contract. Experience is of prime importance. Needling the Navy, the senator offered the story of a group of engineers who resigned from a large firm to form their own small outfit. With a little help from the senator, they were finally able to land a government R&D contract. In two or three years, their business volume passed the $2.5-million mark.

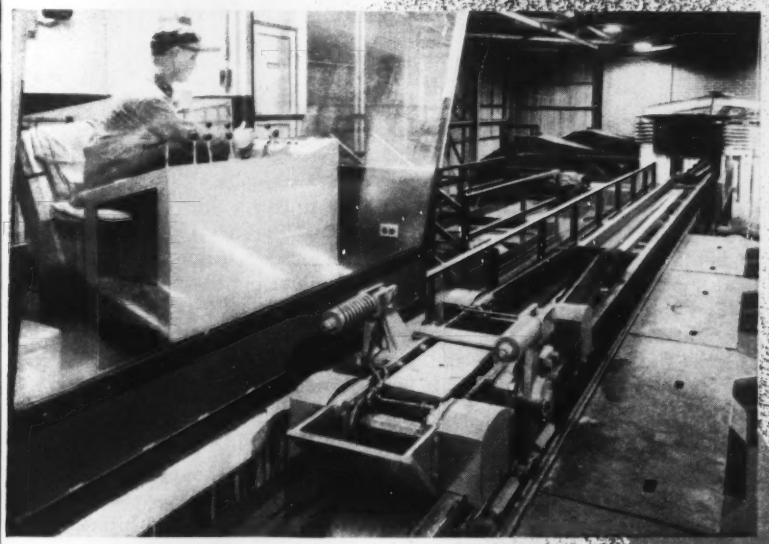
Barter Program Puzzle

Aluminum is back among materials which the Commodity Credit Corp. can barter surplus agricultural products for. Sen. Hubert Humphrey (Dem., Minn.) was surprised to learn this because the General Services Administration is taking plenty of aluminum "puts" under Defense Production Act contracts with U.S. aluminum producers. It looks like Office of Defense Mobilization (the agency which puts metals on the barter list) is operating in the case of aluminum, as some, notably the Interior department, have suggested operating with tungsten. The theory: Dry up the foreign excess coming into the U.S. (a Canadian source?), and you'll help the domestic price situation. Sen. Humphrey will look further into the matter.

Meet Walter H. Lee:

He is the last WOC (without compensation) from industry to head a Business & Defense Services Administration industry division. For six months, Mr. Lee will head the Iron & Steel Division. He is sales manager, construction products division, Sheffield Division, Armco Steel Corp. In Washington, he may be reached at STerling 3-9200, extention 4412.

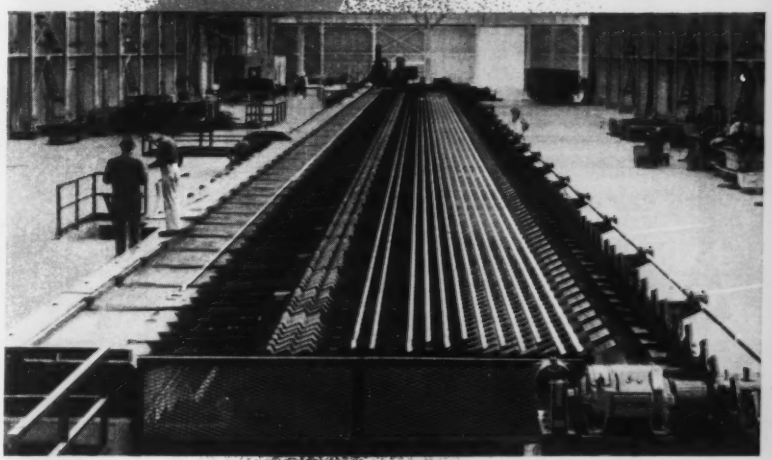
MORGAN MILLS
MORGAN QUALITY



from START to FINISH

MERCHANT AND ROD MILL
Atlantic Steel Company
Atlanta, Georgia

Morgan engineered and equipped from charging car to cooling bed this new Atlantic Steel Mill is now in full operation. This mill is just one of two hundred and twenty-one Morgan continuous rolling mills which have been purchased by steel plants throughout the world.



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MORGAN CONSTRUCTION CO., Worcester, Massachusetts

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RM 72

'LOAD LIFTER' "700"

LIFTS
a full load at top speed

SPOTS
it with 1/100" accuracy on "low"

For fast, positive load control in heavy hoisting and for delicate spotting jobs, the Series "700" 'Load Lifter' Electric Hoist is tough to beat. Its two-speed motor has a *slow* speed for infinitely fine load spotting and a *fast* speed for economical handling during the rest of the work cycle. Both speeds, in a ratio of 3 to 1, are *constant* at fractional or full load. No back drop of load at either speed. The automatic load and motor brakes hold the load exactly where you want it — operate simultaneously, yet either brake alone holds the full load safely.

Other plus features of the Series "700" 'Load Lifter' are headroom-saving design; safe 24-volts at the push button; heavy-duty ball bearings and non-fracturing forged steel load hook; easy serviceability *in the air*. Available in ½ to 15-ton capacities, with one or two speed motors, and with all types of suspension. Learn why the 'Load Lifter' "700" is today's greatest value in heavy-duty electric hoists. *Ask your "Shaw-Box" Distributor for details or write us for Bulletin 410.*

'Load Lifter' Jib Crane. Self supporting — bolts to the floor. Revolves through a complete circle. Swings easily on ball bearings. No binding. A 'Load Lifter' Hoist on this crane can serve a 550 sq. ft. area. Capacities to 5 tons.

Hand Geared Trolley. For I-beam tracks or single girder cranes. Easily mounted on the "700" Hoist. Fits wide range of beam sizes. Ball-bearing wheels roll smoothly. Recommended for hoists of 3-tons or more where accurate spotting of loads is essential.

Motor-Driven Trolley. Recommended for conditions where considerable distances are to be travelled and for heavy loads. Available as original equipment or for installation on 'Load Lifter' "700" Hoists already in service.

'Budgit' Cord Reel. Keeps conductor cord taut. Cord can be led off in any direction. Useful on any hoist or other motor device up to ½ Hp. single phase and 7½ Hp. polyphase. Up to 50 foot cords.

'Load Lifter'® ELECTRIC HOISTS

57G-4

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MANNING, MAXWELL & MOORE, INC.

SHAW-BOX CRANE & HOIST DIVISION

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Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Other Divisions produce 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

In Canada: *Manning, Maxwell & Moore of Canada, Ltd., Avenue Road, Galt, Ontario.*

SHOT AND GRIT OUTLOOK

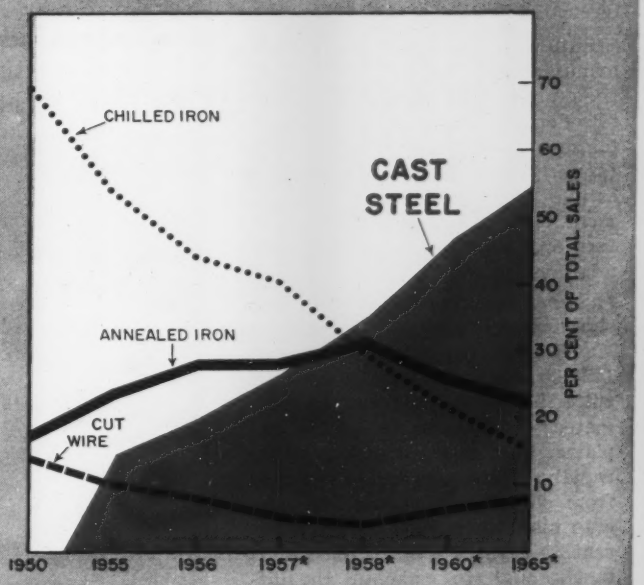
DOLLAR VOLUME:
Will go up.

TONNAGE VOLUME:
Will drop; then rise.

PRICES:
Will increase about 7%.

TREND:
To cast steel shot.

FUTURE:
New uses will boost industry.



Cast Steel Shot Shoots Up

SALES of cast steel shot continue to gain momentum. "If techniques keep on improving at only half the present rate, sales of this product will claim 75 or 80 per cent of the shot and grit market by 1965," contends J. J. Raleigh, sales manager, Cleveland Metal Abrasive Co., Cleveland.

But don't discount the importance of iron shot. While dropping in percentage of total sales, it doesn't figure to suffer a big tonnage decrease in the immediate future. Einer Borch, vice president, National Metal Abrasive Co., Cleveland, states that chilled and malleable iron shot sales by his company this year have increased 34 per cent over 1956's. Chilled iron grit is gaining, too.

The Leader — Chilled iron, the oldest form (originally used to cut granite blocks), claims about 40 per cent of the market.

This is the hardest type of shot and cleans the fastest. It's fine for air blast, nozzle gun equipment. But it causes more wear to tumbling or centrifugal wheel equipment. Having the lowest initial cost ($100 to $125 a ton), it is generally recommended for operations where considerable shot is wasted.

Chilled iron grit gives the sharp chiseled-type finish wanted for painting, bonding or porcelain enameling.

Cast Steel Gaining—This type, which first gained importance in 1953, claims about 28 per cent of the market and is expected to keep climbing. It's used for cleaning (where abrasive loss is controlled) and peening. It's good for cleaning parts prior to plating. Price: $210 to $280 a ton.

"Where loss is controlled, it will last about four times as long as chilled iron and reduces repair costs by over 50 per cent," states Mr. Raleigh. Large cast steel shot gives a smooth hammered-like finish.

Malleable Strong—Sales of heat-treated iron shot continue to hold about 28 per cent of the market. It's expected to stay there for another year or two at least. Mr. Raleigh believes there will continue to be a market for malleable iron shot in foundries where waste is, of necessity, too great to use the more expensive cast steel.

Mr. Borch asserts that malleable iron shot will cut maintenance costs of users of chilled iron by 50 per cent. It will not break readily, giving it twice the life of chilled iron. It's recommended for cleaning forgings, stampings, weldments and other steel parts. Price: $140 to $165 a ton.

Cut Wire Steady—The most expensive ($480 to $560 a ton) metal abrasive, drawn steel cut wire, has clung to a small portion (between 5 and 10 per cent) of the market since 1953. Softer and more uniform than other types, it's used for specialized peening jobs and in cleaning when carry-out and abrasive loss are carefully controlled.

Leo F. Dalton, president, Atom-Steel Inc., Olmsted Falls, O., contends that cut wire shot could seize 20 per cent of the market by 1965. Other manufacturers disagree. Carl Bush, president, Metal Blast Inc.,

Cleveland, believes that cast steel will almost wholly replace cut wire by then because of the price difference.

Future Production? — Several manufacturers expect the industry's production volume to climb. "Production engineers are finally taking an interest in what was formerly regarded as a necessary evil — the shotblasting department," says Mr. Bush. So new uses are being developed to create a larger demand.

Some manufacturers feel that shot and grit tonnage will decrease. Mr. Raleigh expects it to drop to 125,000 tons in 1960, compared with 157,616 in 1955 and an estimated 150,000 in 1957. He explains: Cast steel usage is growing rapidly. When a customer switches from chilled iron to cast steel, he cuts his consumption 50 to 75 per cent. New uses won't be developed fast enough to make up the difference. Present industry capacity is 264,282 tons, says a Bureau of Mines report.

Dollar Volume Up—Whether tonnage goes up or down, manufacturers agree that dollar volume will rise. It may reach $23 million in 1957 and will exceed that figure in 1958, believes Mr. Borch. This compares with about $19 million in 1955 and about $20 million in 1956.

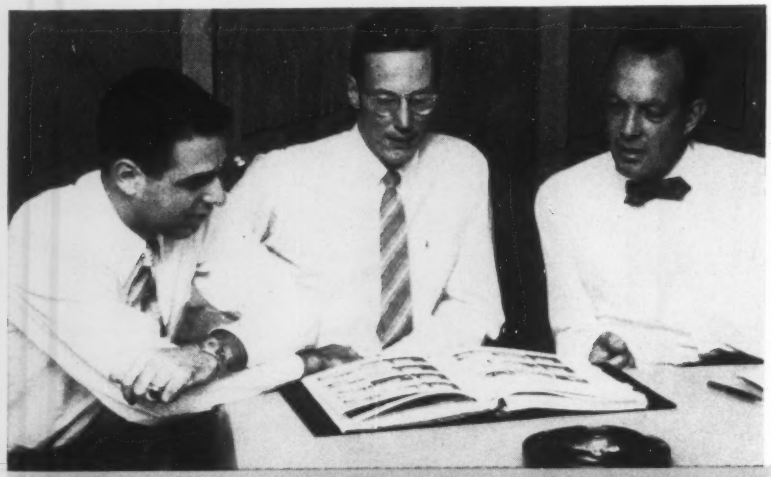
Cited as reasons: The popularity of the more expensive malleable iron and cast steel varieties, plus an expected price hike of about 7 per cent. "Prices of shot depend largely on the scrap market, and it's rising," says L. P. Schick, vice president, Wehenn Abrasive Co., Chicago.

Uses—"Blasting of sheets and strip has become popular in the last year," reports D. L. Coovert, vice president, Pellets Inc., Buffalo. Shotblasting is replacing or is used in addition to pickling in some instances. Wheelabrator Corp., Mishawaka, Ind., installed three machines in a midwest plant to blast coiled rods.

The biggest users of shot and grit are automotive foundries, forging shops and steel mills. Processors of steel sheets and strip are a close fourth. Peening of aluminum forgings is increasing rapidly. Cast steel shot and grit are being used to peen copper components.

Cementing a Partnership

In a college-industry program, professors go to "school" as these university teachers are doing at Warner & Swasey Co.'s plant at New Philadelphia, O.



Peter D. Nigro, Brown University (left), Conrad A. Hilberry, DePauw University (center) and Clayton D. Hatch, manager, New Philadelphia, O., plant of Warner & Swasey Co.

Professors go to industry to . . .

1. See the internal workings of business.
2. Gain insight into management problems.
3. Compare theory with practice.
4. Develop case material for classrooms.
5. Use experience in vocational counseling.

Companies profit, too, as they . . .

1. Learn from professors.
2. Explain business viewpoint.
3. Achieve good will and understanding.
4. Strengthen free enterprise system.
5. Improve public relations.

THE THREE men around the conference table at Warner & Swasey Co.'s New Philadelphia, O., plant were discussing purchasing problems. One was a company plant manager—the other two could have been junior executives or management trainees.

They weren't. One teaches economics at Brown University, Providence, R.I. His partner teaches English at DePauw University, Greencastle, Ind.

Background—The men are among the 86 college professors who will spend two to six weeks working in industry this summer. They have been awarded fellowships under the

College-Business Exchange Program, a project designed to acquaint college instructors with how American business operates.

The program is co-ordinated by the Foundation for Economic Education, Irvington-on-Hudson, N.Y., a nonprofit organization dedicated to the perpetuation of the free enterprise system. Early in the year the foundation mails out about 20,000 program announcements to college professors all over the country. These men (and in some cases women) are invited to send in applications.

About 1500 firms are invited to participate. Companies that want to take an active part send in their preferences, covering such things as fields of study of participants, their ages and colleges. The foundation tries to match these preferences with those of the professors. After the matching process, two to three recommendations are made for each fellowship.

The company makes the final choice. If none of the first recommendations is suitable, the foundation sends in alternate choices. A company is under no obligation to go through with the program if satisfactory applicants are not available.

Applications generally outstrip openings by about 4 to 1. This year 58 firms will be host to professors from 80 universities. To date, 746 professors from 335 colleges have visited the 155 participating companies.

Fellows are paid $100 a week, plus traveling expenses during their stay with the host firm. Most programs last for six weeks, but the period is up to the company, as are all other arrangements after final selections are made.

Example—Warner & Swasey's experiences show how the program functions. Long before the visiting professors make their appearance, plans are laid, interviews set up, department heads alerted. When Dr. Conrad A. Hilberry of DePauw and Peter D. Nigro of Brown arrived at W&S, they immediately began an intensive four-week study of: Sales management, order processing, engineering, advertising and sales promotion, service policies, market research, special machine tool problems, industrial engineering, purchasing, pricing, cost accounting, wages and salary programs and industrial relations.

The program is kept flexible enough so the visitors can alter parts of the itinerary to observe areas of interest. As far as possible, any requested information is made available. Questions are encouraged—criticism asked for.

As Warner Seely, W&S vice president for public relations, puts it: "The professors ask questions on all phases of our operation and are sometimes quite critical. We try to answer each question as honestly as possible. Sometimes they see things our own management doesn't. After all, the program is a two-way street—they learn from us; we learn from them."

Purpose—The idea that industry and education can work as partners instead of rivals was fostered by the foundation ten years ago when it set up the first exchange program. A statement by the Public Opinion Index for Industry, Princeton, N.J., best sums up the reason for such an undertaking:

"Both educators and business leaders have been distressed to find that the American people have a wholly inadequate understanding of how our economy functions for the common good. Industry's leaders have often criticized the teaching profession, but in the past have not done much to help educators. One conclusion is clear: Educators are dedicated to finding and teaching the truth. If industry will give them an opportunity to discuss problems, ask questions and see for themselves how companies operate, a more realistic picture will be passed on to the younger generation."

Mr. Seely backs up this observation: "The fact that W&S has been participating in the program since 1950 indicates how much we think of it. We have a tremendous interest in helping to broaden the thinking of those who have the responsibility of teaching. We feel that too often a teacher enters education straight out of college with no experience or practical contact with the economic system."

Other Side—The professors are unanimously in favor of the program.

A poll of past participants pointed up that 84 per cent thought the program was "highly valuable"; the remaining 16 per cent rated it "good."

Here are comments from the two sponsored by W&S this year. Dr. Hilberry: "This program gave us a chance to get to know what a businessman is really like. We learned that W&S executives can take off their gray flannel coats and repair machines. The apprentice program is flexible. A young man headed for administrative work doesn't have to go through the same training as a machinist."

Mr. Nigro: "We have been impressed at W&S with the efficiency that is maintained without any pressure. Most college people feel that businessmen are primarily interested in making profits and lack a sense of moral responsibility. On the contrary, we find that the executives here have a high moral sense toward their customers, stockholders and employees. We are impressed by the methods used to train and develop junior executives to take on higher jobs. Not seniority, but ability is the test. We find support for the incentive plan, not only among management but among workers as well. Also impressive is the amount of money spent on research, not for immediate profit, but for future efficiency and sales."

Porcelain on Aluminum Booms

A 50 per cent increase in the use of porcelain enamel on aluminum this year is forecast by the Porcelain Enamel Institute's aluminum division. The total is expected to hit 5.2 million sq ft.

The building industry, largest single market in 1956, is slated to take 3.8 million sq ft this year. In 1956, it used 2.4 million sq ft.

PEI predicts a 500 per cent increase by 1961, which would bring the total to 23 million sq ft.

Applications include: Signs, small appliances, cooking utensils and sanitary ware.

The institute's report pointed out that the material's range of colors, its lightness and low maintenance give it a wide variety of uses.

By 1961, the institute predicts, the use of porcelain enamel on aluminum will have penetrated extensively into the automotive, railroad and airplane industries.

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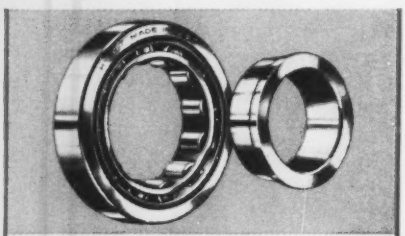

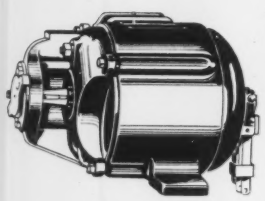

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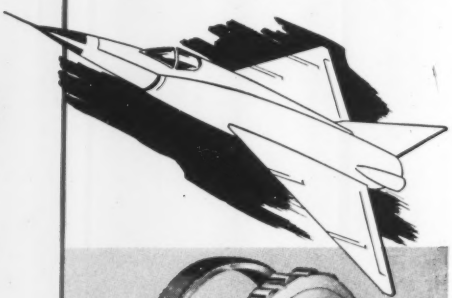

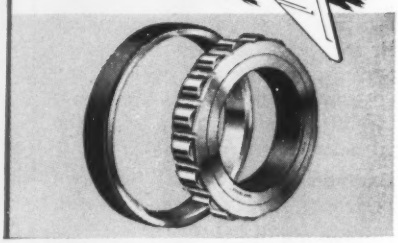

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FOR MODERN INDUSTRY

Car Buyers Are Specifying More 'Extras'

	Air Conditioning (In Thousands)	Automatic Trans. (Per Cent of Total Output)	Power Brakes (Per Cent of Total Output)	Power Steering (Per Cent of Total Output)
1957 . . .	350	80	30	36
1956 . . .	251	74	24	27
1955 . . .	182	68	21	22
1954 . . .	58	58	18	19

All figures based on model year installations; estimated for 1957.
Chart material from Ward's Automotive Reports.

Optional Equipment Gains

So popular is air conditioning that some car models may be introduced with windows permanently closed. Look for automatic transmissions to become standard

OPTIONAL EQUIPMENT is making slow but steady progress, production statistics from auto makers reveal.

Automatic transmissions, power brakes and power steering show a 6 per cent gain this year. Air conditioning installations are going into 22 per cent of the luxury cars, compared with 16 per cent a year ago. The medium lines are up to 5 per cent from 2.5 per cent in 1956.

Since 1953, when car coolers first caught on, independent manufacturers have accounted for about a third of all sales. Price has been a factor. Auto makers have to design different cooling units to fit each make of car. This tacks $50 to $80 on the price. Outside firms make standard packages which will fit most cars. Their average price now is about $300, compared with a $380 average for Big Three brands.

Look for Action—Car companies would like to increase the percentage of factory sales. They figure the best way to do this is to boost volume, which will reduce unit manufacturing costs. So look for a big sales campaign in '58 and '59.

General Motors, for example, has several test cars with windows which won't roll down. They're snapped into the frames; ventilation is provided through the air conditioning system.

If adopted, the idea would save manufacturing dollars in roller mechanisms. It could pave the way for diecast doors with snap-in extruded window moldings. Selling the concept to a motoring public accustomed to pitching banana peels and other objects out the window will be a slow job. But the idea could turn up on a 1959 GM dream car.

Transmissions—Several top industry officials feel automatic transmissions will be standard equipment in five years or less. Automatics are going into 90 per cent of production in 14 of the 19 makes this year, says *Ward's Automotive Reports.*

They're already standard equipment on luxury lines. Rumor has it at least three top lines in medium priced divisions will make the switch in '58. About 53 per cent of this year's low priced car buyers are specifying automatics, compared with 47 per cent last year.

Companywise, Chrysler Corp. leads the industry with almost 90

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per cent of its cars getting pushbutton automatics, compared with 75 to 80 per cent at GM and Ford Motor Co. The pushbutton idea is spreading. Ford's Edsel is supposed to have pushbuttons on the steering column. Other Ford divisions probably will follow suit.

Although no basic changes are expected in 1958 transmissions, Buick will bring out its version of the Turboglide. This gearbox was shelved because of unforeseen design problems this year.

Power Accessories—It's becoming apparent to Detroit engineers that power steering is a must on cars weighing over 3900 lb.

Eleven lines offer power steering as standard equipment, and seven include power brakes on the standard list. The Ford Division seems to push power steering more than other car builders this year. It's putting power units on 25 per cent of its production.

Although power brakes aren't quite as necessary as power steering, dealers offer such dandy package deals few customers can resist. Look for prices to hold the line or possibly to come down slightly on these two items.

AC Gets Missile Contract

The AC Spark Plug Division of GM has received a $38-million order for inertial guidance systems that go into Air Force ballistic missiles.

W. E. Milner, manager of AC's Milwaukee operations, says the systems are for the Thor intermediate range missile.

The order covers research, development and production.

Most of the production work will be carried on in AC's Milwaukee plant although the Flint, Mich., facilities will help.

Mr. Milner says much of the guidance system work will be subcontracted to smaller businesses. AC is one of 17 prime contractors in the Air Force ballistic missile program.

FMC: Near Record Sales

First half sales of Ford cars and trucks are second only to those in 1955.

Dealer car sales through June are 13 per cent ahead of those in the same 1956 period and 5.3 per cent behind 1955's.

Here's the first half breakdown:

Ford Motor Co. Sales

	1957	1956
Cars	956,834	846,895
Trucks	155,924	141,145
Totals	1,112,758	988,040

General Motors has not officially revealed its first half sales. Unofficially, it has lost 6 per cent of the market in sales so far this year.

On a percentage of the industry basis, Chrysler Corp. is more than 5 per cent ahead of its 1956 first half sales; American Motors Corp. is about even with last year; Studebaker-Packard Corp. is down 1 per cent.

Manifold Transfer Line

Snyder Tool & Engineering Co., Detroit, has built a segmented transfer line that can machine automotive engine intake manifolds from rough castings to finished part.

Built-in sensing devices automatically shift heads at three stations to permit interchangeable feeding of two or four-barrel manifolds.

The line is 230 ft long, turns out 136 parts an hour. Machining removes about 18 lb of metal from each 70-lb manifold.

U.S. Auto Output

Passenger Only

	1957	1956
January	642,089	612,078
February	571,098	555,596
March	578,826	575,260
April	549,239	547,619
May	531,365	471,675
June	500,271	430,373
6 Mo. Total	3,372,888	3,192,601
July		448,876
August		402,575
September		190,726
October		389,061
November		581,803
December		597,226
Total		5,802,808

Week Ended	1957	1956
June 15	125,372	100,689
June 22	118,805	105,148
June 29	125,909	103,034
July 6	73,682	68,110
July 13	112,618†	112,361
July 20	125,000*	113,416

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Exhaust Notes

- Kaiser Aluminum & Chemical Corp. has presented stylized versions of an automobile featuring radiators and fuel tanks built into frame side rails. The car also sports roll-top roof, deck lid and hood.
- Talk around town has it that the stainless steel industry is mapping a comeback fight to get more stainless trim on '59 cars.
- Standard Products Co., Detroit auto supplier, says it's getting a finish identical to chrome plated steel by flashing chrome directly on aluminum. The finish will withstand 75-hour salt spray tests.
- Chrysler has developed a three-day test tube check for rubber parts that's the equivalent of seven years of service, reports W. J. Simpson, managing engineer of the company's organic materials laboratory.
- GM's Buick Division has developed a fan with a silicone fluid clutch which runs faster when the engine is idling and slower at higher speeds when less cooling is needed. Buick engineers say it will prevent overheating in air conditioned cars operating at low speeds.
- James J. Nance, Ford's marketing vice president, warns that growing economic imbalance threatens an inflation that can strike as devastating a blow as a depression.
- A production employee now has to work only 915 hours to earn enough to buy a car. In 1947, he had to put in 981 hours, says Charles L. Jacobson, Chrysler vice president in charge of dealer relationships.
- Bostrom Mfg. Co., Milwaukee, is making its special suspension truck seat for tilt cab trucks.
- The U.S. automotive industry produced 1,107,796 trucks and 4206 motor busses in 1956. Their wholesale value exceeded $2 billion, the Automobile Manufacturers Association states. Twenty per cent were exported. More than 10.7 million trucks (about half the world total) are in domestic use. About 28 per cent are on farms. Truck registrations have doubled since 1945.

FACTS

about

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- Pillow Blocks easily mounted without special tools.
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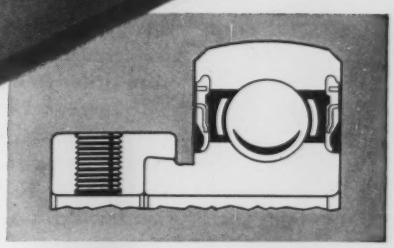

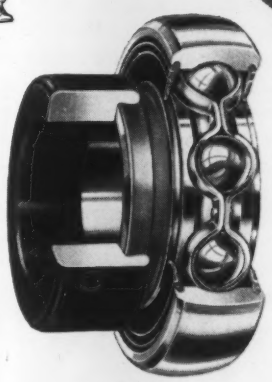

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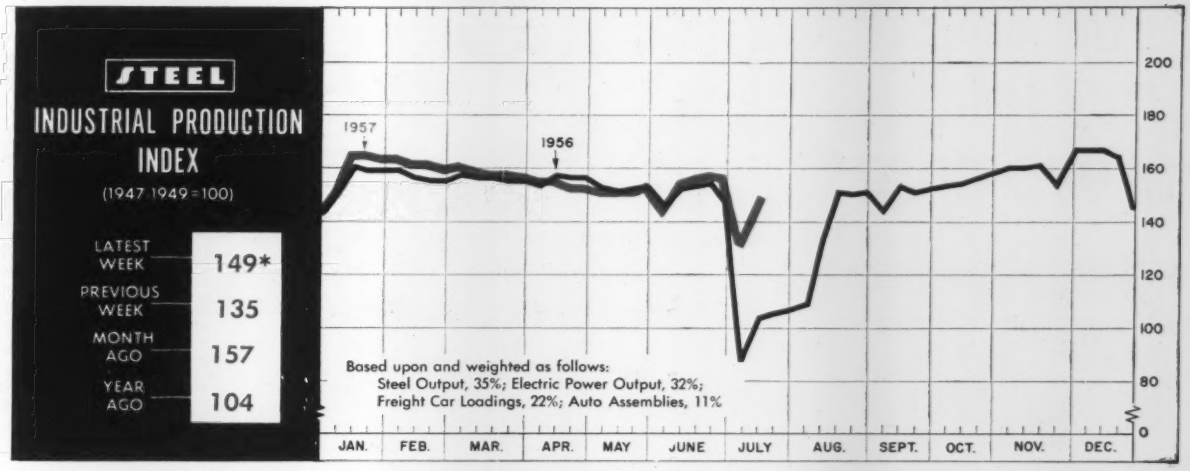

*Week ended July 13.

Employment Holding at Record Heights

JUNE EMPLOYMENT figures issued by the government evidence the soundness of our economy. As long as this country has practically full employment for five days a week and wages hold up, there can't be too much wrong.

Unimpressive Records—The bare figures tell a story of records for the month, although they aren't overly impressive when compared with the tremendous gains of the last two years. Employment, according to the departments of Labor and Commerce, came to 66.5 million last month, an increase of 1.3 million over the May figure. Students and graduates, as usual, accounted for practically all the gain. The 59 million figure for total nonagricultural employment also set a record for the month.

Interpretation—But the significance of the reports can be seen in the reversal or leveling out of several downtrends of fairly long standing. Manufacturing employment turned up for the first time since the fourth quarter of last year. Even though the increase was less than seasonal, it is encouraging to note that better than usual increases were chalked up by radio and TV manufacturers and furniture makers—the industries were among the hardest hit by inventory adjustments earlier this year. This could mean that the worst is past. The downtrend in durable goods employment showed definte signs of leveling off.

The work week also did a turnabout, advancing from 39.7 hours in May to 39.9 in June. This was the first increase since last December. Durable goods industries particularly contributed to this improvement, jumping from 40.2 hours a week in May to 40.5 hours in June. Every durable goods industry which reported a drop in number of workers checked in with a longer work week. Overtime, which had been declining this year, jumped from 2.2 hours a week to 2.4 hours.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,073[1]	2,015	377
Electric Power Distributed (million kw-hr)	11,600[1]	11,056	10,878
Bituminous Coal Output (1000 tons)	1,500[1]	7,900	1,317
Petroleum Production (daily avg—1000 bbl)	7,050[1]	6,952	7,084
Construction Volume (*ENR*—millions)	$323.5	$483.6	$657.4
Auto, Truck Output, U. S., Canada (*Ward's*)	144,522[1]	95,615	146,173
TRADE			
Freight Car Loadings (1000 cars)	710[1]	535	620
Business Failures (Dun & Bradstreet)	190	208	204
Currency in Circulation (millions)[3]	$31,313	$31,146	$30,923
Dept. Store Sales (changes from year ago)[3]	+4%	+2%	+3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$17,237	$25,761	$22,702
Federal Gross Debt (billions)	$272.9	$270.4	$273.0
Bond Volume, NYSE (millions)	$20.8	$18.7	$16.6
Stocks Sales, NYSE (thousands of shares)	13,246	9,257	11,359
Loans and Investments (billions)[4]	$88.2	$87.0	$85.5
U. S. Govt. Obligations Held (billions)[4]	$26.3	$24.9	$26.6
PRICES			
STEEL's Finished Steel Price Index[5]	239.15	239.15	210.45
STEEL's Nonferrous Metal Price Index[6]	216.6	217.0	259.4
All Commodities[7]	117.8	117.4	113.9
Commodities Other Than Farm & Foods[7]	125.5	125.4	121.4

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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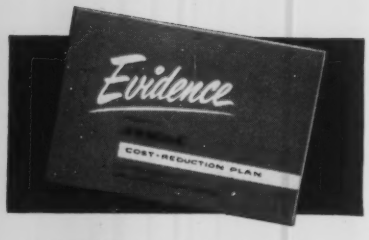

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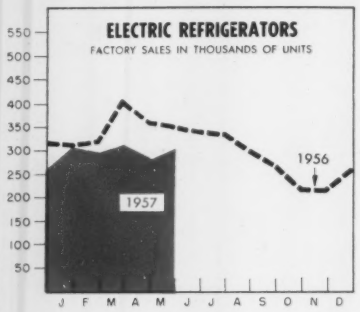
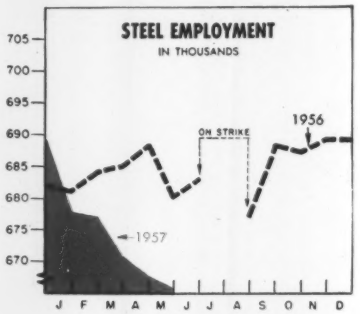


	Units		
	1957	1956	1955
Jan.	305,400	308,900	381,197
Feb.	298,700	316,000	338,575
Mar.	309,300	403,500	392,774
Apr.	281,600	353,300	364,298
May	303,700	346,800	390,385
June	.....	335,068	395,936
July	.....	331,916	323,240
Aug.	.....	297,906	310,789
Sept.	.....	262,359	313,143
Oct.	.....	212,200	235,945
Nov.	.....	211,600	234,786
Dec.	.....	257,400	312,535
Totals ...	.....	3,636,949	3,993,603

National Electrical Mfrs. Assn.
Charts copyright, 1957, STEEL.



	Employment in Thousands		Payroll in Millions	
	1957	1956	1957	1956
Jan.	678	681	$360.4	$329.1
Feb.	677	684	327.5	317.3
Mar.	671	685	344.2	338.1
Apr.	668	688	331.5	326.7
May	666	680	338.0	333.6
June		683	....	332.4
July		n.a.	....	n.a.
Aug.		677	....	300.9
Sept.		688	....	339.0
Oct.		687	....	358.9
Nov.		689	....	346.0
Dec.		689	....	347.2

n.a.=not available because of strike.
American Iron & Steel Institute.

Net Effect—It all adds up to more money for the worker to spend in the market place. After standing still for two months at $2.06, average hourly earnings moved up to $2.07. Coupled with longer hours, this fattened the average weekly pay envelope from $81.78 to $82.59, reversing the downtrend dating back to January.

What Next?—Chances are good that more employment records will be toppled this month and next. July and August are usually the peak months. Continued heavy construction work and an expected strengthening in agricultural employment after a slow start (bad weather) should guarantee that 1957 will be no different. Gains probably won't be as impressive as those of recent years for several reasons.

First, there can be no denying that output of goods has slowed down a bit from the all-time highs of last year. But purchasing agents have consistently said that employment is ranging from even to slightly better than what it was a year ago. STEEL's midyear survey of more than 5000 metalworking plant managers indicates a slight improvement in the second half (see STEEL, July 1, p. 34).

Second, the working force is not growing as fast this year as it did last year. Even counting students who can't find summer work, unemployment is less than 4.8 per cent of the civilian work force. So there isn't as much room for improvement.

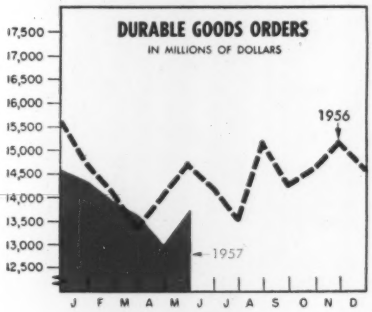
Third, expansion of industry has slowed down somewhat over the past year. Fewer new jobs are being created.

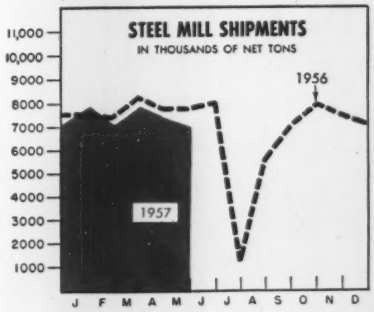
Fourth, the drive to cut costs in the face of a profit pinch is limiting hiring to some extent.

1956 GNP: $414.5 Billion

Now it's official. Gross national product last year was $414.5 billion, 6 per cent ahead of the $391.5-billion figure racked up in 1955. The Department of Commerce attributes about half the gain to rising prices. Other official figures: National income, $343.6 billion vs. $324.1 billion in 1955; personal income, $326.9 billion vs. $305.9 billion; personal savings, $20 billion vs. $15.8 billion. Corporate profits after taxes stayed at 1955's $21 billion despite significantly higher sales in 1956.

During the first quarter of this year, GNP continued to climb,





	New Orders* 1957	New Orders* 1956	Sales* 1957	Sales* 1956
Jan.	14,393	14,683	14,642	13,595
Feb.	13,979	14,107	14,726	13,593
Mar.	13,524	13,337	14,438	13,294
Apr.	13,012	14,073	14,159	13,519
May	13,746†	14,732	14,159†	13,754
June	.....	14,185	.....	13,850
July	.....	13,513	.....	12,627
Aug.	.....	15,166	.....	13,665
Sept.	.....	14,266	.....	13,692
Oct.	.....	14,591	.....	14,199
Nov.	.....	15,130	.....	14,321
Dec.	.....	14,544	.....	14,507

*Seasonally adjusted. †Preliminary.
U.S. Office of Business Economics.

	Net Tons 1957	1956	1955
Jan.	7,809,451	7,587,870	6,009,958
Feb.	7,066,732	7,468,393	6,119,900
Mar.	7,821,616	8,255,824	7,268,795
Apr.	7,349,752	7,783,873	7,279,321
May	6,972,091	7,764,776	7,540,889
June	.....	8,077,805	7,770,213
July	.....	1,288,988	6,250,597
Aug.	.....	5,539,915	7,053,615
Sept.	.....	7,058,028	7,378,247
Oct.	.....	7,930,957	7,216,821
Nov.	.....	7,431,136	7,247,994
Dec.	.....	7,064,093	7,580,943

American Iron & Steel Institute.

reaching a seasonally adjusted annual rate of $429.1 billion. The Cleveland Trust Co.'s *Business Bulletin* predicts that the second quarter is likely to show a further rise. But the squeeze on corporate profits is also tightening. The Federal Trade Commission says that of the 23 major industry groups covered in its first quarter report, 18 increased sales over those of the first quarter of 1956. But when profits after taxes are compared, only five groups showed a gain.

A Dun & Bradstreet Inc. survey of businessmen's expectations for the fourth quarter offers some hope for profits. For every eight manufacturers who thought there will be an increase in sales in the fourth quarter, compared with the year-ago period, only one thought there would be a decline. Eighty-nine per cent of the respondents said profits will be equal to or better than the comparable 1956 level.

Housing Bill Signed

Last week, the construction industry got a boost and a setback.

The boost: With the signing of the new federal housing measure, home builders claim they are in a better position to test the strength of the market. It is doubtful that there will be much change in the picture this year, but 1958 may see a turn for the better.

The setback: Heavy construction projects were being held back last week by strikes in nearly half the nation's cement plants. In some areas, supply dried up completely ten days after the strike. Construction dependent on cement came to a halt.

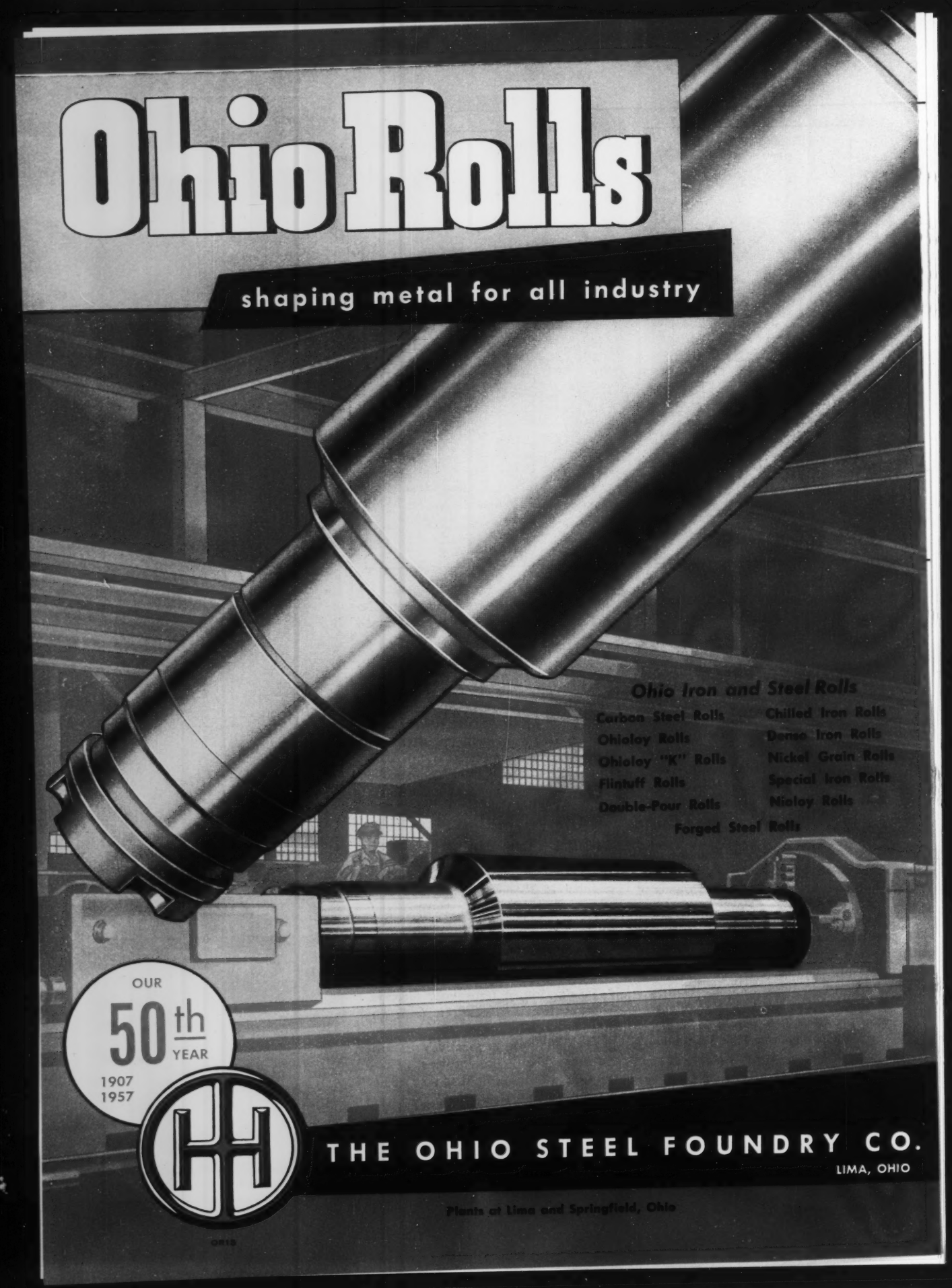
Trends Fore and Aft

• New car sales in June were the highest in 15 months, says *Ward's Automotive Reports.* Dealers cut their inventories to 34 days and set the stage for the production of 1,288,000 units in the third quarter.

• Production of household electric refrigerators recovered a trifle in May (see chart, page 76), but appliance makers generally are still fighting heavy inventories. Production of household electric ranges continued to skid.

• Although the steel industry employed 14,000 less this May than last (see chart, page 76), its payroll costs increased almost $4.5 million.

COOLIDGE
Balls
CHROME ALLOY AND STAINLESS
COOLIDGE CORPORATION
MIDDLETOWN, OHIO


Ohio Rolls
shaping metal for all industry
Ohio Iron and Steel Rolls
Carbon Steel Rolls
Ohioloy Rolls
Ohioloy "K" Rolls
Flintuff Rolls
Double-Pour Rolls
Chilled Iron Rolls
Dense Iron Rolls
Nickel Grain Rolls
Special Iron Rolls
Nioloy Rolls
Forged Steel Rolls
OUR
50th
YEAR
1907
1957
THE OHIO STEEL FOUNDRY CO.
LIMA, OHIO
Plants at Lima and Springfield, Ohio

JAMES BERE
Axelson Mfg. president

NORMAN J. SCHAFFER
Scovill Div. works manager

KENNETH W. FINCH
chief eng.-Weatherhead div.

SAMUEL A. GAREE
Gas Machinery operations mgr.

James Bere was named president of **Axelson Mfg. Co.**, Los Angeles, division of U.S. Industries Inc. He was general manager.

Norman J. Schaffer was made works manager, forging and screw machine division, **Scovill Mfg. Co.**, Waterbury, Conn. He was factory superintendent for the division.

John R. Lenox was elected vice president - operations, **Datamatic Corp.**, Newton Highlands, Mass., a subsidiary of Minneapolis-Honeywell Regulator Co. He is replaced as general manager of Honeywell's appliance controls division, Gardena, Calif., by **Raymond S. Fries.**

Milford H. Luttrell was named general sales manager, **Walworth Co.**, New York.

William H. Cochrane joined **Neptune Meter Co.**, New York, as executive vice president. He was general manager, industrial division, Lever Bros. Co.

Robert M. Kearns and **Barclay Morrison** were made managers of two new departments established by the alloy tube division of **Carpenter Steel Co.**, Union, N. J. Mr. Kearns will head the engineering and planning department; Mr. Morrison, the product engineering and development department. **James P. Kelleher** was made assistant product engineering and development manager.

J. A. Ackley was elected a vice president, **Pyrofax Gas Corp.**, unit of Union Carbide Corp., New York.

Kenneth W. Finch was made chief engineer, **Weatherhead Co.**, Ft. Wayne, Ind., division. He served in the same capacity for the automotive division of Fedders-Quigan Corp.

Leslie A. Cretty was made manager of product development, Waterbury Mfg. Co. plant, **Chase Brass & Copper Co.**, Waterbury, Conn.

Wilfred M. Price was elected president and general manager of **American LaFrance Corp.**, Elmira, N.Y. He was executive vice president. He succeeds **J. F. Connaughton** as president.

Daniel A. Walther was made chief engineer, **Dayton Steel Foundry Co.**, Dayton, O. He succeeds **E. Leslie Miller.** Mr. Walther also is president of Moraine Mfg. Co., a subsidiary.

D. H. Mitchell was made eastern sales manager for **LeTourneau-Westinghouse Co.**, with offices at headquarters in Peoria, Ill. He succeeds **James A. Vincent,** now vice president-general manager of Adams Construction Equipment Co., a LeTourneau-Westinghouse distributorship being organized in Florida.

Thomas L. Kelley, former sales manager, instrument division, **Tracerlab Inc.**, Waltham, Mass., was made nuclear sales manager.

Jesse P. Johnston was made combustion engineer of the Middletown, O., Works' engineering department, **Armco Steel Corp.**

Samuel A. Garee was appointed manager of operations for **Gas Machinery Co.**, Cleveland. He was general manager of Gas Atmospheres Inc.

Austenal Inc., Microcast Division, New York, appointed **Charles R. Skinner** assistant sales manager; **Ralph M. Churchill,** eastern district manager; **Joseph M. Uhle,** western district manager, Chicago; **William H. Lund,** manager of new products.

George R. Ziegler succeeds **W. Porter Goodman,** retired, as general superintendent of the Chicago Heights, Ill., plant of **Inland Steel Co.**

J. Martin Stokes was made assistant to the vice president-sales, **Firth Sterling Inc.**, Pittsburgh. He is replaced as manager, carbide sales division, by **Carl C. Krogh. William J. Ulm** was relieved of his temporary duties as assistant to the vice president-sales and will devote full attention to his responsibilities as manager, customer service.

R. G. Ellis was named staff assistant to the vice president and assistant general manager of **Micromatic Hone Corp.**, Detroit. He was chief engineer.

Donald T. French joined **Elliman Steel Co.**, Detroit, as vice president. He was a sales representative for Great Lakes Steel Corp.

Metal & Thermit Corp., New York, appointed **D. W. Oakley** production

J. M. HANING

HOWARD H. HILDRETH

Washington Steel sales appointments

L. F. HICKERNELL

LEONARD L. CARTER

Anaconda Wire & Cable appointments

manager to succeed **H. A. Rack,** now manager of engineering.

Washington Steel Corp., Washington, Pa., appointed **J. M. Haning** manager of home office sales; **Howard H. Hildreth,** manager of strip sales. Mr. Hildreth was manager of product development.

Irb H. Fooshee was elected executive vice president; **James G. Fox Jr.,** vice president of General Chemical Division, **Allied Chemical & Dye Corp.,** New York. Mr. Fooshee was vice president-development. Mr. Fox was director of operations.

Eugene Carpenteir was appointed chief engineer, diecasting divisions, **Hoover Ball & Bearing Co.,** Ann Arbor, Mich. He was chief engineer, Universal Die Casting Division, Saline, Mich. **Howard Russ,** purchasing director of Universal, was made director of purchases for Hoover's diecasting divisions.

Chainveyor Corp. appointed as division managers **Fred Voss,** district 2, with headquarters in Chicago; **Ellis Jeffers,** district 3, with headquarters in Detroit. Mr. Voss replaces **William Schilling,** who returns to the Los Angeles engineering office. Mr. Jeffers, who recently resigned as sales manager, Rapistan Keystone Division, Rapids-Standard Co., replaces **C. L. Long,** now factory manager of Chainveyor's Los Angeles plant.

George W. Frahn Jr. was made general manager of **George W. Frahn & Sons,** Toledo, O. He succeeds **Paul J. English,** resigned.

F. C. Reichert was made plant metallurgist (Graham, W. Va.), **Vanadium Corp. of America.** He was assistant plant metallurgist, Niagara Falls, N. Y., division.

Harry J. McMahon was made assistant to the general manager, Yorkville, O., Works, **Wheeling Steel Corp. James R. McCleery** was promoted to assistant to the general manager, Martins Ferry, O., factory.

Lawrence C. Pejeau, general sales manager, was made vice president-sales, **Matthiessen & Hegeler Zinc Co.,** La Salle, Ill.

Paul Dearborn fills the new post of director of packaging markets at **Reynolds Metals Co.,** Louisville.

Frank W. Ingold was named to the new post of sales manager, Cincinnati steel service plant, **Joseph T. Ryerson & Son Inc.** He is replaced as sales representative in the Ohio area by **Elmer A. Jahnke Jr.**

Thomas Scatchard was made director of manufacturing for Berkeley Division, **Beckman Instruments Inc.,** Los Angeles. He was plant manager. **Robert M. Ward,** former division manager for Thompson Products Inc., was made manager of the Berkeley Division.

John L. Tullis, vice president-sales, **J. B. Beaird Co. Inc.,** Shreveport, La., was advanced to vice president and assistant general manager, with executive responsibility for all phases of Beaird operations.

George A. Green was named western district manager, **Process Instruments Division,** Beckman Instruments Inc., Newport Beach, Calif.

L. F. Hickernell, chief engineer, was elected vice president-engineering, **Anaconda Wire & Cable Co.,** New York. He will direct engineering as well as research and development. **Leonard L. Carter** was named chief engineer. **Henry V. Van Valkenburg** was made general sales manager.

Paul A. Manor, chief engineer of **Rockwell Mfg. Co.'s** Barberton, O., valve division, was promoted to chief engineer, central valve research and development department at Pittsburgh.

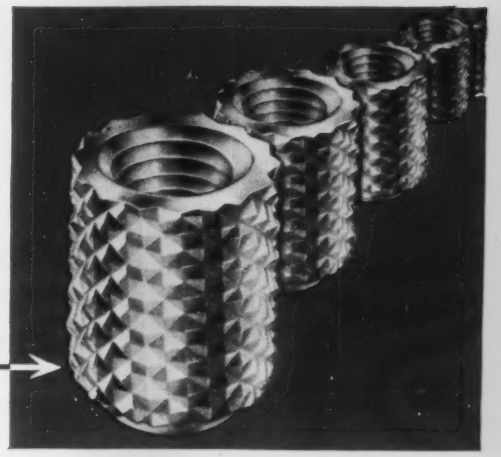
Electric Storage Battery Co., Philadelphia, announces election of **Roland Whitehurst** as president of its subsidiary, **Jessall Plastics Inc.,** Kensington, Conn. A vice president of the parent company, he continues in Philadelphia as head of the **Exide Industrial Division. Monroe G. Smith,** comptroller of the corporation, assumes added duties as general manager of Exide Industrial, a position relinquished by Mr. Whitehurst. **William C. Leingang** was appointed general manager of **Stokes Molded Products Division,** Trenton, N.J.

At **Republic Steel Corp.'s** Youngstown district, **Eugene L. Kline** was made assistant superintendent, open hearth strip and bar mills; **Gabriel J. Erdos,** assistant superintendent, butt and continuous weld tube mill.

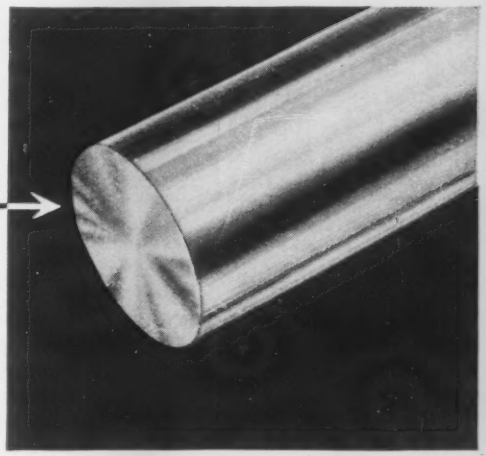
George Eichelsbach Jr. was elected vice president-manufacturing, **McCulloch Motors Corp.,** Los Angeles.

F. C. Langston Jr. was made sales manager, diesel engine division, **Harnischfeger Corp.,** at Crystal

Say you have to produce
50,000 parts like this . . .



from aluminum
screw machine stock . . .



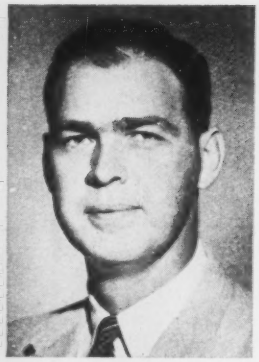
To be sure you have the
right alloy and temper—
and a ready supply of stock—
call on your

REYNOLDS DISTRIBUTOR

Look under "Aluminum"
in the classified phone book
for your Reynolds Distributor

LOUIS R. WANNER
Sylvania Electric mfg. post

JOSEPH W. ESKRIDGE
AMC v. p.-special products



U. VICTOR TURNER
gen. mgr. of Vitramon Inc.

ROBERT C. CRAGG
K. W. Battery exec. v. p.

GEORGE J. MORTON
Pressed Metals of America pres.

WILLIAM A. COOK
Phoenix Iron & Steel pres.

Lake, Ill. He was with the Electro-Motive Division, General Motors Corp.

Robert C. Cragg was elected executive vice president, **K. W. Battery Co. Inc.**, Skokie, Ill. He was midwest regional manager, Gould National Batteries Inc.

George J. Morton, general manager, **Pressed Metals of America Inc.**, Port Huron, Mich., was elected president. Mr. Morton is also president of Ferro Cast Corp., Santa Monica, Calif.

David Duff was made manager-product engineering, Everett-Lynn Foundries, **General Electric Co.**, Schenectady, N.Y. **Nathan L. Whitecotton** was elected a commercial vice president of GE with headquarters in Philadelphia.

Bennett D. Jones, manager of product development for **Standard Pressed Steel Co.**, Jenkintown, Pa., was promoted to the new post of technical director, aircraft division.

William A. Cook was elected president of **Phoenix Iron & Steel Co.**, Phoenixville, Pa., subsidiary of Barium Steel Corp. He replaces **Rudolph Eberstadt**, former president of Phoenix Iron & Steel and Phoenix Bridge Co.

At U.S. Steel Corp.'s **Tennessee Coal & Iron Division**, Birmingham, **David W. Cox** was named assistant to the vice president-operations. He is succeeded by **O. H. Wilson** as superintendent, coke and coal chemical department, Fairfield Works. Other appointments: **John H. Munson Jr.** as assistant general superintendent-coke plant; **Albert C. Jones**, superintendent of mills, Fairfield Works; **Thomas G. Shurett**, assistant division superintendent-mills; **John W. Johnson**, superintendent-plate mill; **Leonard C. Dean Jr.**, superintendent-structural mill.

Ohio Rubber Co., Willoughby, O., division of Eagle-Picher Co., appointed **Richard C. Kremer** vice president-general sales.

Louis R. Wanner fills the new post of manufacturing manager in charge of plastics, metal base, assembly and formatic operations for **Sylvania Electric Products Inc.** at Warren, Pa. He was plant manager of plastics operations.

Joseph W. Eskridge was elected vice president and general manager, special products division, **American Motors Corp.**, Detroit. He succeeds **Stuart G. Baits**, retired. Mr. Eskridge was vice president-manufacturing of the division.

U. Victor Turner was made general manager of **Vitramon Inc.**, Bridgeport, Conn. He was manager of contracts, purchasing and production control departments of Vectron Inc.

Fred L. Goldsby, vice president and former general sales manager, was made assistant to the president, **Chicago Bridge & Iron Co.**, Chicago. **S. C. Hamilton**, former Houston district sales manager, was made a vice president and general sales manager of CB&I with headquarters in Chicago. **K. W. Lange**, went from San Francisco to Houston as district sales manager.

Hugh L. Planche was made division tubular manager, Canadian division, **National Supply Co.**, with headquarters at Calgary, Alta. He succeeds **B. J. A. Sturrock**, resigned.

OBITUARIES...

Winfred B. Holton Jr., 68, retired chairman, **Walworth Co.**, New York, died July 12.

Joseph J. Hochbein, 58, owner, **Hercules Machine Tool & Die Co.**, Warren, Mich., died July 8.

James C. Miles, 74, head of **Miles Equipment Corp.**, Cleveland, died July 10.

Leo H. Sonderman, 58, assistant treasurer and tax manager of **Harnischfeger Corp.**, Milwaukee, died July 5.

Russell Duer, 58, Cincinnati district sales manager, **Wheelabrator Corp.**, died July 4.

George H. Riddle, sales engineer, rails and track accessories, **Bethlehem Steel Co.**, Bethlehem, Pa., died July 7.

ANACONDA WIRE & CABLE COMPANY

INTER-OFFICE CORRESPONDENCE

COPIES TO:

G 400A

DATE July 1, 1957

TO: Fred Luna

OFFICE Hastings

FROM: W. E. Sprackling

SUBJECT: ADVERTISING

REFERRING TO: Quality Control Inspection - ETL

FILE REFERENCE:

Fred, we've been telling our customers about our methods of Inspection, our Quality Control, and other manufacturing safeguards. But perhaps we're missing a bet. I think the BIG THING is what the Electrical Testing Laboratories, Inc. does for us -- not just the fact that they calibrate all of our testing equipment (that's quite common), but that they actually go through our test reports at all mills annually to see that our testing system is functioning the way management planned it.

I don't think any other outfit goes so far as to have such a complete independent audit. To me -- that's newsworthy -- our customers should know that we have an outside agency -- fully competent -- to watch after their interest.

Why not tell our story broadly -- after all, it's to the customers' interest -- they will appreciate, I'm sure, what is being done for them.

W. E. S.

P. S. And another important thing -- the inspection department is entirely separate and independent of production -- reporting only to the Vice President in Charge of Manufacturing.

JEF - What more could we say? Sin for running this as is. What do you think? Fred

OK - JEF

57422

11 year continuity in oxygen production with "on-location" generators

Since 1946, Weirton Steel Company, a division of National Steel Corporation, has obtained its oxygen requirements from "on-location" generators... designed and built by Air Products, Incorporated. Present production capacity is 300,000,000 cu.ft./mo. of low-purity (95%) and 35,000,000 cu.ft./mo. of high-purity (99.5%) oxygen . . . for all uses from blast furnace air enrichment to scarfing.

Many steel companies obtain low-cost oxygen from dependable Air Products generators in many combinations of quantity, purity and pressure.

We produce: package, tonnage and custom-built oxygen and nitrogen generators. Check with us for detailed information on a dependable and continuous supply of low-cost oxygen. Air Products, Incorporated, P.O. Box 538, Allentown, Pa.

Air Products
...INCORPORATED

Weirton Steel...

...put three 2,000 cfh oxygen generating plants (total—4,000,000 cf/month)—built by Air Products—into operation over eleven years ago. Since that time, Air Products has met the increasing needs for oxygen at Weirton by supplying additional oxygen facilities (up to the present 335,000,000 cf/month total capacity).

This continuity of a low-cost supply of oxygen over the years has been possible only through the use of dependable "on-location" generators—designed and manufactured by Air Products.

Continuity of supply at Weirton is a typical benefit resulting from steel companies' use of "on-site" oxygen generators. Other steel companies enjoy such profitable advantages as: substantial reductions in oxygen cost . . . dependable production of high purity oxygen 24 hours/day . . . flexibility in meeting increased or decreased demand through proper equipment sizing. Even plants requiring limited quantities of oxygen can profitably use Air Products generators.

Let us show you how you can have a dependable low cost supply of oxygen without capital investment. Air Products "on-site" oxygen generators supply many of the nation's leading steel plants. We'd like to talk to you about them . . . your inquiry is invited. Air Products, Incorporated, P.O. Box 538, Allentown, Pa.

Air Products ...INCORPORATED

Bethlehem Expands

Open-hearth and five annealing furnaces are added to facilities at Lackawanna, N.Y., plant

AN EXPANSION program at Bethlehem Steel Co.'s plant at Lackawanna, N. Y., which will boost ingot capacity to 6 million tons, will be completed this month.

The last phase of the program, setting up of a skin pass mill in a new 68,000 sq-ft building, is expected to be finished soon. Completion of this mill (used to temperize cold-rolled sheets after annealing) will mark the end of the project which was started last year (STEEL, Feb. 6, 1956, p. 79).

Adds Open Hearth—The expansion included addition of a 250-ton open-hearth furnace, bringing to 35 the number of steelmaking open hearths at the Lackawanna plant. Capacity was raised by more than 600,000 tons.

Five annealing furnaces are being placed in operation. These radiant tube-fired type furnaces are housed in a 125 by 375 ft building (Coil Annealing Building No. 3).

Foundations also were laid for another open-hearth furnace to be built when needed for future expansion. The soaking pits were enlarged and two small blast furnaces were modernized and their capacities increased. A slab reheating furnace was completed earlier this year.

Carrier Enlarges Facilities

Carrier Corp. is operating a new unit-heater production line at its Syracuse, N. Y., plant. The facilities include a press shop, metal cleaning and rustproofing equipment, paint-spray booths and ovens to provide a baked enamel finish on the heaters.

Buys Railway Equipment Line

Canadian Car Co., Montreal, Que., purchased Standard Railway Equipment Co.'s Canadian railway equipment business. Manufacturing operations will continue at the Lachine, Que., plant for about a year pending construction of Canadian Car's Dominion plant. Products include boxcar roofs, hopper car doors, refigerator car brine tank assemblies, ice tanks and coupler centering and operating devices.

Steel Fabricator Building

DeLaney Co. is constructing a steel fabricating plant on Jack Rabbit road near Tomball road, Houston. Cost is estimated at $1.5 million.

Sabo Tool Builds Addition

Sabo Tool & Mfg. Co. is expanding its plant at 600 Brookpark Road, Cleveland 9, O., to accomodate additional precision machinery.

Basic Inc. Opens Branch

Basic Inc., Cleveland, producer of refractories, has opened a $500,000 distribution center at Hammond, Ind. This is the first step in the firm's scheduled expansion in 1957.

Fabricator Boosts Capacity

Installation of an 18-ton capacity, 70-ft span overhead crane is expected to increase production of fabricated structural steel by more than 30 per cent at Apex Steel Corp. Ltd., East Los Angeles, Calif.

GE Installs Huge Furnace

A gas-fired car-bottom furnace is being used to stress relieve huge castings and welded steel structures at General Electric Co.'s large motor and generator plant in Schenectady, N. Y. Although it carries a nominal rating of 100 tons, the furnace has processed loads as high as 150 tons. Maximum load dimensions: 30 ft long, 18 ft wide and 16 ft high. Total maximum heat input is 10 million Btu an hour.

Foundry Starts Operations

First production heats were poured early this month in American Brake Shoe Co.'s new aluminum alloy foundry at Mahwah, N. J. The $625,000 installation provides 25,000 sq ft of foundry

(*Please turn to page* 89)

SPECIALIZED RESEARCH

This expansion test illustrates why the special composition developed for Kaiser Periclase Chrome brick assures better end wall service.

To show the effect of steel plates on permanent growth, two types of pre-fired brick with steel plates on four sides were laid up to form the side-walls of a test furnace. This furnace was heated with gas to 3100°F., ± 25°, and held there for 16 hours.

After cooling, the bricks were measured for comparative permanent growth. The effects shown were solely of the heating and iron oxide reaction. The chrome-magnesite type (upper row) showed an average 9% permanent linear growth; Kaiser Periclase Chrome (lower row) grew an average of only 1.4%.

This test demonstrates one of the many ways that Kaiser Chemicals research continuously proves—and improves—specialized products for better service to the steel industry.

PRODUCT SPECIFICATION

Compare these specifications to those of any other end wall brick . . . and the comparison will tell you why more and more open hearth operators specify Kaiser Periclase Chrome Brick—long respected for its consistent high quality and consistent high performance values.

1. Greatly increase end wall life when needed, or 2. Cuts costs with thinner walls when end wall service is balanced.

1. CHEMICAL ANALYSIS: (Typical)

	Chemically Bonded	Burned
Loss on Ignition	3.7%	0.0%
CaO	1.0	1.0
SiO_2	8.4	8.7
Cr_2O_3	9.1	9.4
Fe_2O_3	4.5	4.7
Al_2O_3	7.9	8.2
MgO (by difference)	65.4	68.0
	100.0	100.0

2. PHYSICAL PROPERTIES: (Typical)

REFRACTORINESS: Hot Load Test (shear Temp. @ 25 lbs./sq. in.) . . . 3090°F 3090°F

Deformation, @ 25 lbs./sq. in., ½ hr. @ 3000°F . . 2–5%

P.C.E. Value . . . over 42 over 42

VOLUME STABILITY: Shrinkage (no load) Linear, % (after firing to 3000°F 5 hrs.) . . . 0%

Linear Coefficient of Reversible Expansion (in./in./°F) (80-2730°F) . . . 6.25x10⁻⁶

Reversible Thermal Expansion @ 2730°F . . . 1.7%

POROSITY: Apparent . . . 20.5%

True . . . 7.5% 21.5%

DENSITY: Bulk, lbs./cu. ft. 187 179

Av. Wt. of 9"x4½"x3" Straight, lbs. . . . 12.9 12.4

STRENGTH: Crushing strength, lbs./sq. in. . . . 9,000 5,000

MEAN SPECIFIC HEAT: (85-1830°F) (Btu/lb./°F) . . . 0.264

*Figure not constant over temperature range.
**No value applicable. Brick is burned in test.

All three show why you get superior with Kaiser Periclase Chrome

USERS'
EXPERIENCE
COMPARATIVE END WALL TRIAL
"... had inspected walls they prior to accident and noted Kaiser Periclase Chrome Metal Encased Brick sections were plumb, in line and tight whereas other panels were bowed and leaking."
END WALL REPORT
"... Panels of Kaiser Periclase Chrome Metal Encased Brick went 402 heats while comparative panels in the same campaign were replaced at 265 heats."
END WALL REPORT
"... Furnace finished its third campaign using Kaiser Periclase Chrome Brick end wall for a total of 562 heats. Furnaces using other brick usually lasted only 200 heats—one campaign."
These statements from Kaiser Chemicals customers illustrate new performance or production records made possible by changing to Kaiser Periclase Chrome basic brick.
This brick—like every other Kaiser Chemicals refractory—is especially designed for peak performance in a specific application. Its patented composition is backed by more than 15 years of continuous research, development and experience.
Let your Kaiser Chemicals sales engineer explain how you can take full advantage of Kaiser Periclase Chrome Brick in your operation.

end wall service Basic Brick

Call or write Kaiser Chemicals Division, Dept. S7151, Kaiser Aluminum & Chemical Sales, Inc., at any of the regional offices listed below:

PITTSBURGH 22, PA. . . . 3 Gateway Center
HAMMOND, IND. . . . 518 Calumet Building
OAKLAND 12, CALIF. . . . 1924 Broadway

CHEMICALS KAISER REFRACTORIES

Kaiser Chemicals

Pioneers in Modern Basic Refractories

REFRACTORY BRICK & RAMMING MATERIALS • CASTABLES & MORTARS • MAGNESITE • PERICLASE • DEADBURNED DOLOMITE • ALUMINAS

SPECIALIZED RESEARCH

This expansion test illustrates why the special composition developed for Kaiser Periclase Chrome brick assures better end wall service.

To show the effect of steel plates on permanent growth, two types of pre-fired brick with steel plates on four sides were laid up to form the side-walls of a test furnace. This furnace was heated with gas to 3100°F., ± 25°, and held there for 16 hours.

After cooling, the bricks were measured for comparative permanent growth. The effects shown were solely of the heating and iron oxide reaction. The chrome-magnesite type (upper row) showed an average 9% permanent linear growth; Kaiser Periclase Chrome (lower row) grew an average of only 1.4%.

This test demonstrates one of the many ways that Kaiser Chemicals research continuously proves—and improves—specialized products for better service to the steel industry.

PRODUCT SPECIFICATION

Compare these specifications to those of any other end wall brick . . . and the comparison will tell you why more and more open hearth operators specify Kaiser Periclase Chrome Brick—long respected for its consistent high quality and consistent high performance values.

1. Greatly increases end wall life when needed, or 2. Cuts costs with thinner walls when end wall service is balanced.

1. CHEMICAL ANALYSIS: (Typical)

	Chemically Bonded	Burned
Loss on Ignition	3.2%	0.0%
CaO	1.0	1.0
SiO_2	8.4	8.7
Cr_2O_3	9.1	9.4
Fe_2O_3	4.5	4.7
Al_2O_3	7.9	8.2
MgO (by difference)	65.4	68.0
	100.0	100.0

2. PHYSICAL PROPERTIES: (Typical)

REFRACTORINESS: Hot Load Test (shear Temp. @ 25 lbs./sq. in.)	2090°F	3090°F
Deformation, @ 25 lbs./sq. in., ½ hr. @ 3000°F	**	2–5%
P.C.E. Value	over 42	over 42
VOLUME STABILITY: Shrinkage (no load) Linear, % (after firing to 3000°F-5 hrs.)	**	0%
Linear Coefficient of Reversible Expansion (in./in./°F) (80-2730°F)	*	6.25×10^{-6}
Reversible Thermal Expansion @ 2730°F	**	1.7%
POROSITY: Apparent	—	20.5%
True	7.5%	21.5%
DENSITY: Bulk, lbs./cu. ft.	187	179
Av. Wt. of 9" x 4½" x 3" Straight, lbs.	12.9	12.4
STRENGTH: Crushing strength, lbs./sq. in.	9,000	5,000
MEAN SPECIFIC HEAT: (85-1830°F) (Btu/lb./°F)	**	0.264

*Figure not constant over temperature range.
**No value applicable. Brick is burned in test.

All three show why you get superior with Kaiser Periclase Chrome

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COMPARATIVE END WALL TRIAL
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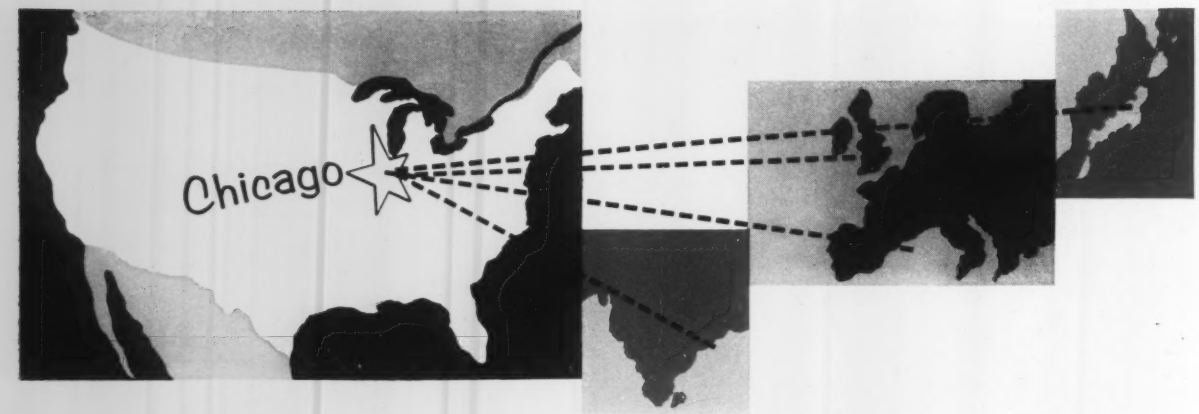
Kaiser Chemicals

Pioneers in Modern Basic Refractories

REFRACTORY BRICK & RAMMING MATERIALS • CASTABLES & MORTARS • MAGNESITE • PERICLASE • DEADBURNED DOLOMITE • ALUMINAS



39th National Metal Exposition
2nd World Metallurgical Congress

In the whole, wide, wonderful world of metals, for one fast-moving, action-packed week, Chicago will be world headquarters for metal men.

From wherever metals are made . . . from wherever metals are used . . . from all parts of the United States and around the free world, the responsible men of metals will move into Chicago the week of November 4, 1957.

Engineers and scientists . . . executives and production experts . . . the responsible men of metals will be in Chicago to see the 39th National Metal Exposition — the best, the biggest, the most important Metal Show of them all. Hundreds of manufacturers will place their best products and operating processes and equipment on display in the vast International Amphitheatre and New Exposition Halls. This great Exposition will make show history . . . will make metals history.

And this is only half the story. World authorities on metals . . . outstanding scientists from the United States . . . again, the responsible men of metals will be speakers at the 2nd World Metallurgical Congress and at the 39th National Metal Congress. Technical and practical sessions will begin on Saturday, November 2, and run continuously through Friday, November 8. Never before has such an array of metals engineering and scientific talent been assembled on so vast a scale . . . engineering developments of world-wide impact will be presented for all to hear and digest and discuss.

You will want to attend this great event, this world metals week in Chicago. Your organization may well wish to send management, engineering and sales representatives. Make the first move now — write for hotel reservation forms.

AMERICAN SOCIETY FOR METALS

The Engineering Society for the Metal Industry

7301 Euclid Avenue — Cleveland 3, Ohio

Cooperating Societies: Metals Division, American Institute of Mining, Metallurgical and Petroleum Engineers . . . the Society for Non Destructive Testing . . . the Industrial Heating Equipment Association.

Exhibit Space Available

Hundreds of manufacturers have reserved Metal Show space, but there are good locations still available in the vast new exposition halls of the International Amphitheatre. If the metalproducing or metalworking industries are your market, don't miss this show — write for display information now.

(*Concluded from page* 85)
space for the production of high-strength aluminum alloy castings for aircraft and missile use. It also will permit increased production of commercial castings.

Dow Chemical Opens Branch

Dow Chemical Co., Midland, Mich., opened a sales office at 1 Gateway Center, Pittsburgh 22, Pa. Donald H. Gilmore is manager.

Henry Equipment Co. Renamed

Henry Equipment Co., Bowling Green, O., changed its name to Henry Mfg. Co. Inc. New officers are: President, H. H. Harms; vice presidents, Don Harms and John Harms. The company makes machines for filtration and recovery of metalworking coolants.

Enlarges Diecasting Facilities

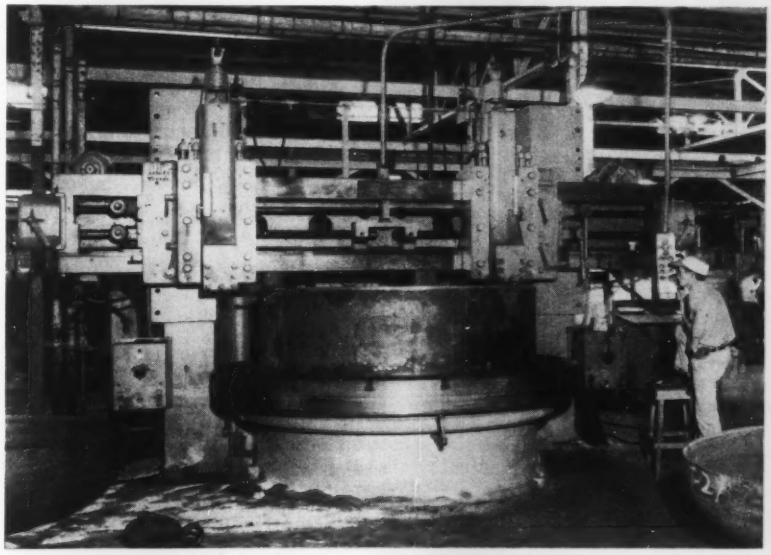
Sunbeam Corp. is constructing a 40,000 sq-ft building at 5600 W. Roosevelt Road, Cicero, Ill., to house new diecasting operations. Cost, exclusive of equipment, will be about $750,000. Operations are scheduled to start in about eight months. The diecastings will be utilized in the firm's small appliances and other products.

Doubles Casting Facilities

Alloy Precision Castings Co. is enlarging its plant at 3855 W. 150th St., Cleveland, permitting the company to double its existing facilities. The company is a subsidiary of Mercast Corp., New York, and is a producer of mercury investment castings based on the Mercast process.

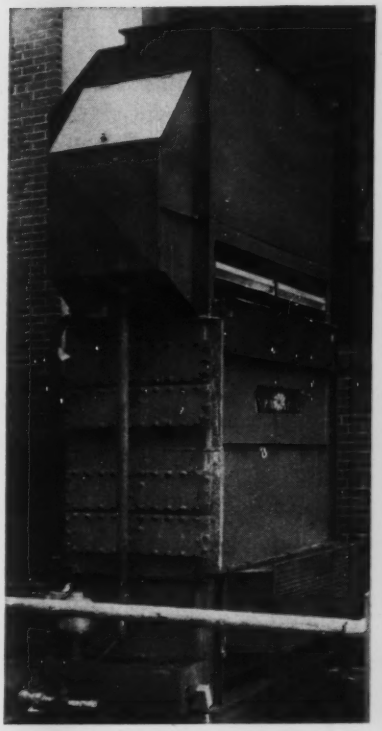
Colorado Firm Expanding

Mine & Smelter Supply Co. has completed a million dollar expansion program which includes an office building and additional sales and warehouse facilities at 3800 Race St., Denver 16, Colo. The company is a distributor of steel products, machinery, electrical equipment and supplies, chemicals and laboratory supplies. The manufacturing divisions of the firm and its subsidiary, Colorado Iron Works, make Marcy ball and rod mills, valves, laboratory equipment, heavy media separators



Beaird Installs King Size Vertical Boring Mill

Massive machine tools at J. B. Beaird Co. Inc.'s plant, Shreveport, La., are doing precision work on large diameter parts for custom fabricated products. The latest addition in the tooling program of this manufacturer of heavy steel products is a vertical boring mill (above) with a 108-in. table. The machine weighs 35,000 lb and has a 47-in. clearance under the cross rails, giving it capacity to cut king size diameters. It is presently machining 6.5-ft diameter flanged and dished heads of tanks for North American Car Corp., Chicago



You Get Better Results in HEAT TREATING!

Use the NIAGARA AERO HEAT EXCHANGER to control the temperature of your quench bath and you remove the heat at its rate of input, always quenching at the exact temperature that will give your product the best physical properties.

The Niagara Aero Heat Exchanger transfers the heat to atmospheric air by evaporative cooling. It extends your quenching capacity without using extra water. It pays for itself with water savings.

You can cool and hold accurately the temperature of all fluids, gases, air, water, oils, solutions, chemicals for processes and coolants for mechanical and electrical equipment. With the Niagara Aero Heat Exchanger you have closed system cooling, free from dirt and scale.

Write for Bulletin No. 120

NIAGARA BLOWER COMPANY

Dept. S-7, 405 Lexington Ave.
NEW YORK 17, N. Y.

District Engineers in Principal Cities of U. S. and Canada

and densifiers, dryers and other industrial equipment.

Chase Steel Builds Warehouse

Chase Steel & Supply Co. will construct a 20,000 sq-ft warehouse in Los Angeles for distribution of stainless steel products.

Armco Buys Sintering Unit

Armco Steel Corp., Middletown, O., purchased a sintering unit which it had been leasing from the federal government. The installation at Armco's Hamilton, O., plant was built by the Reconstruction Finance Corp. Designed to recover flue dust and iron ore fines, it has been operated continuously by Armco since April, 1943, and serves three blast furnaces: Two at Hamilton and one at Middletown.

Kennametal Enlarges Facilities

Kennametal Inc., Latrobe, Pa., has completed enlargement of manufacturing facilities at its Chestnut Ridge, Pa., and Detroit plants. An addition to the Mining Tool Division plant now under construction at Bedford, Pa., is expected to be ready for operation late this summer. The latest unit at Chestnut Ridge provides 24,000 sq ft of space and houses the forming specialties department. The addition to the Detroit plant expands production space 50 per cent. The new Bedford unit will double manufacturing capacity for processing carbide alloys used in cutter and drill bits.

ASSOCIATIONS

A group of engineers representing the leading solid carbide tool manufacturers formed the **Solid Carbide Tool Institute,** 295 Madison Ave., New York 7, N. Y. Main objectives: To establish uniform physical standards for solid carbide cutting tools; to standardize nomenclature and marking of this type of tool.

Two men have joined the staff of **Malleable Founders' Society,** Cleveland. Allen H. Forbes II becomes shop practice engineer while Donald B. Sanberg has assumed general administrative duties under Lowell D. Ryan, executive vice president.

John D. Keane was appointed director of research and executive secretary of the **Steel Structures Painting Council,** Pittsburgh. Purpose of this organization is to find the most effective and economical methods of protecting steel against corrosion through coatings. Participants in this council include the American Institute of Steel Construction, American Iron & Steel Institute and the Association of American Railroads.

Automotive Engine Rebuilders Association moved to 901-903 Roosevelt Bldg., 9 N. Illinois St., Indianapolis 4, Ind.

CONSOLIDATIONS

Marsellus Vault & Sales Co. purchased **General Pressed Metal Corp.** Both are in Syracuse, N. Y. General Pressed Metal, producer of metal stampings for the automotive industry, will be operated as a division.

Chain Belt Co., Milwaukee, is broadening its activity in the construction equipment field through purchase of **L. Burmeister Co.,** that city. Burmeister makes concrete mixing and bulk handling equipment.

Mississippi Valley Structural Steel Co., St. Louis, purchased two companies in Chattanooga, Tenn.: **Converse Bridge & Steel Co. Inc.** and **Industrial Steel Erection Co.** These firms, formerly subsidiaries of Siskin Steel & Supply Co., will be operated as the Converse Division of Mississippi Valley. F. A. Dollinger is manager of Chattanooga operations; Kenneth Cook, chief engineer.

American Hardware Corp., New Britain, Conn., acquired **Kwikset Locks Inc.,** Anaheim, Calif., and will operate the property as a subsidiary. It brings American Hardware into the low-cost residential lockset market. Officers of Kwik-

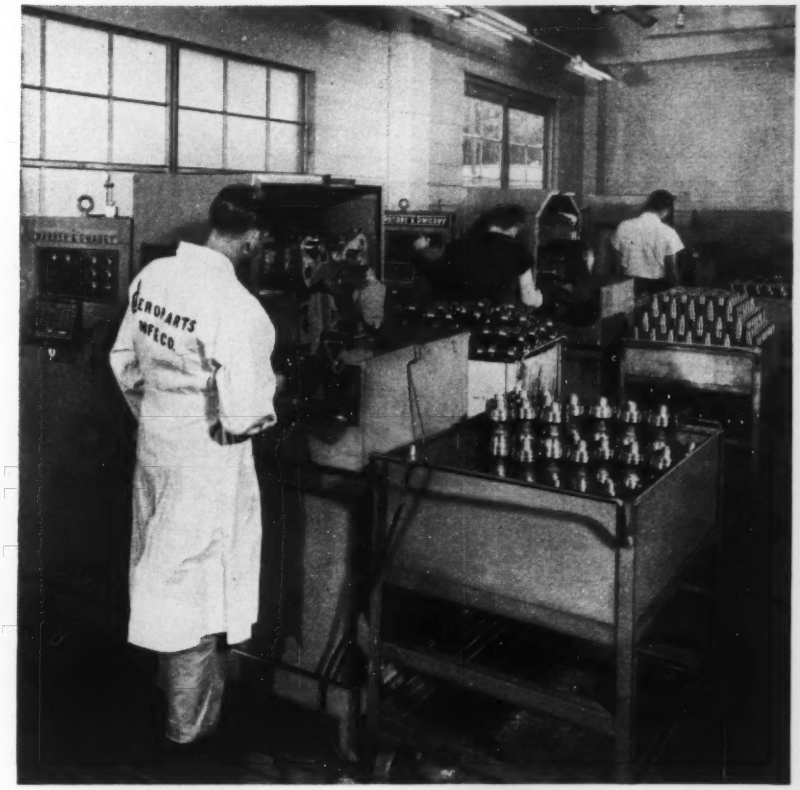
(*Please turn to page* 96)

PIONEERS IN ALLOY CUSTOM FABRICATION

Look for this symbol of quality

- Fabrication of stainless steel, aluminum and other alloys from .020 to 3/16".
- Experience to fabricate close tolerances and intricate shapes.
- Acres of machinery for quantity production or prototype development.
- Machinery available for polishing, shearing, bending, drawing, annealing, spinning... other specialized techniques to rigid specifications.
- Blickman know-how makes alloys behave during simple or complex fabricating.
- For specific information regarding your fabricating needs, write S. Blickman, Inc., 7207 Gregory Avenue, Weehawken, N. J.

BLICKMAN
SPECIAL PRODUCTS



AEROPARTS MANUFACTURING COMPANY'S RECIPE FOR SUCCESS

Take on the Tough jobs put them on a Warner & Swasey

R. E. Radford started his company in Tulsa, Oklahoma, in 1943 with a $350.00 investment. Today, his new 40-man plant does sub-contracting on a national scale with a reputation for price and quality.

But, success was not immediate. Even as late as 1952, business prospects looked dim. Then, a man's resourcefulness plus a new kind of machine teamed up to start a literal chain reaction of success. Here's how it happened.

Radford had the idea that there was a profitable future in taking on the tough jobs that were not desirable to other companies. He also had faith to back his convictions. Now all he needed was the right machine to do the job . . . his search was a short one . . . the new Warner & Swasey 1 AC looked like the machine.

This new single spindle chucker allowed him to expand from his former policy of making screw machine parts to one involving larger, more complicated work . . . permitted him to run short cycle jobs at close tolerances of .001" and less . . . hold micro-inch finishes down to 20 RMS . . . make full use of the machine's late cross slide, flexible tooling characteristics. The dependability of this machine impressed him as much as did its productivity.

These advantages, and others that soon reflected themselves in increased values rendered to his customers, brought more business. So another Warner & Swasey 1 AC was installed in 1954 and a third in 1955.

Today, men and management at Aeroparts maintain their high regard for their Warner & Swaseys. And in "Tex" Radford's words, "These machines were integral in the growth of this company!"

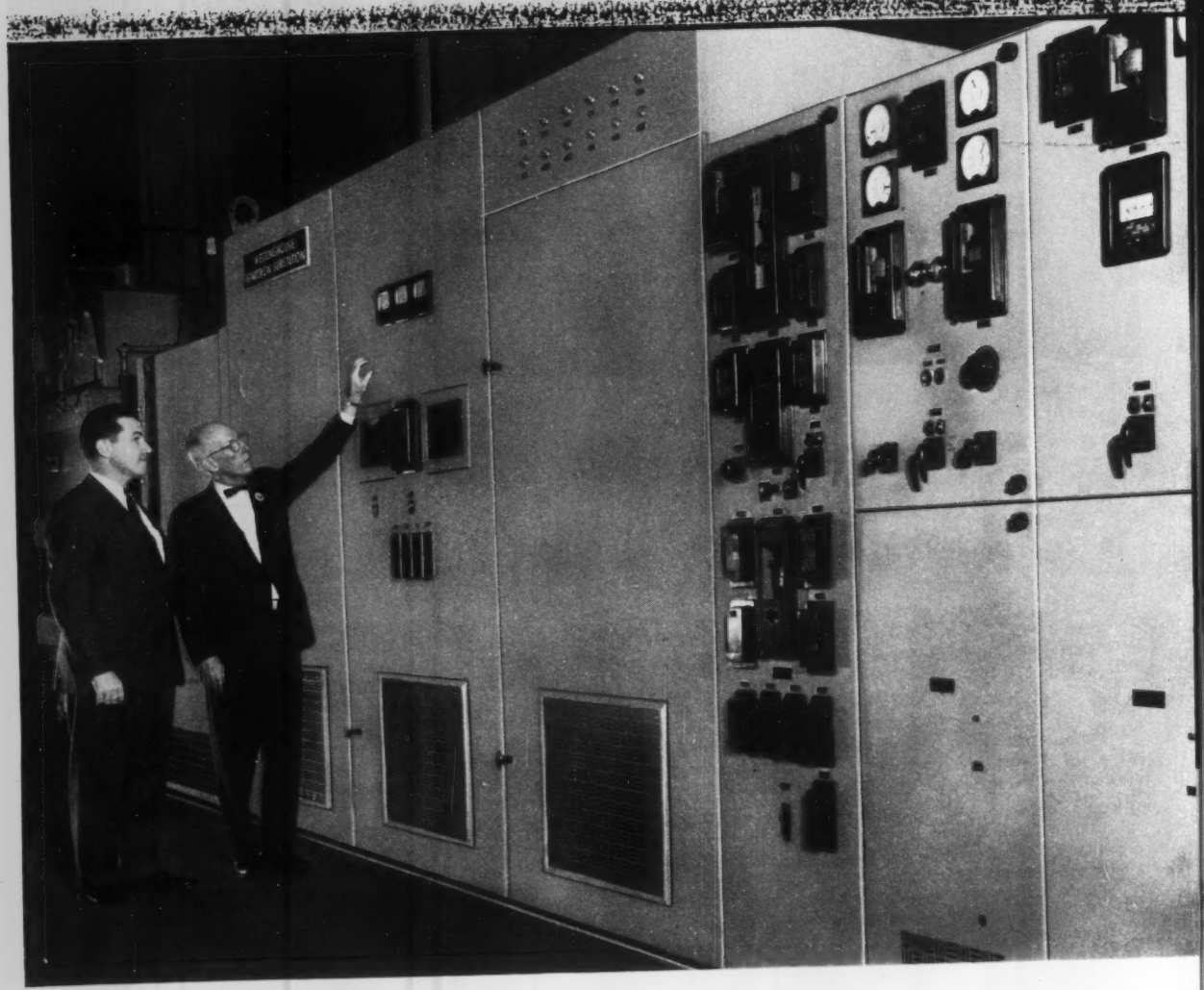
YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS

...WITH A WARNER & SWASEY

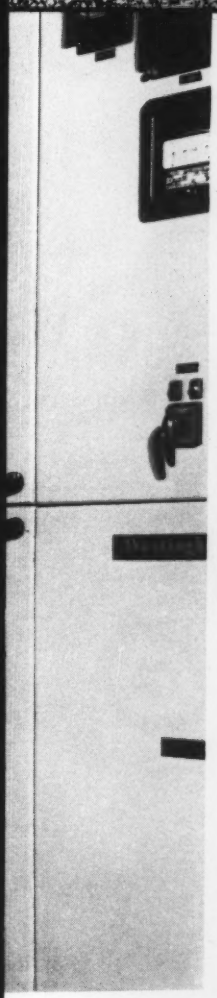
WARNER & SWASEY
Cleveland
PRECISION MACHINERY SINCE 1880

for dependable DC power...plus

Steel mill lists 7 "musts" for a rectifier...



orders Westinghouse Ignitron



BEFORE MAKING A DECISION on the purchase of a rectifier, the chief electrical engineer of a large Eastern steel mill jotted down 7 "musts". His search for the ideal steel mill rectifier soon ended, for he found that the Westinghouse Ignitron met all of his requirements:

LOW INSTALLATION COST Simply interconnect the adjacent metal cubicles which are pre-wired.

SMALL FLOOR SPACE The Ignitron assembly and auxiliary equipment are contained in compact cubicles which are close-coupled.

NO SPECIAL FOUNDATION Any reasonably level floor of normal strength will do.

SAFE Grounded dead-front metal enclosure permits safe location in any available space. No need for fencing or insulated floors.

LOW MAINTENANCE Principle of operation permits simple design . . . no major moving parts.

HIGH OVERLOAD CAPACITY Momentary overloads and short circuits won't damage the Westinghouse Ignitron.

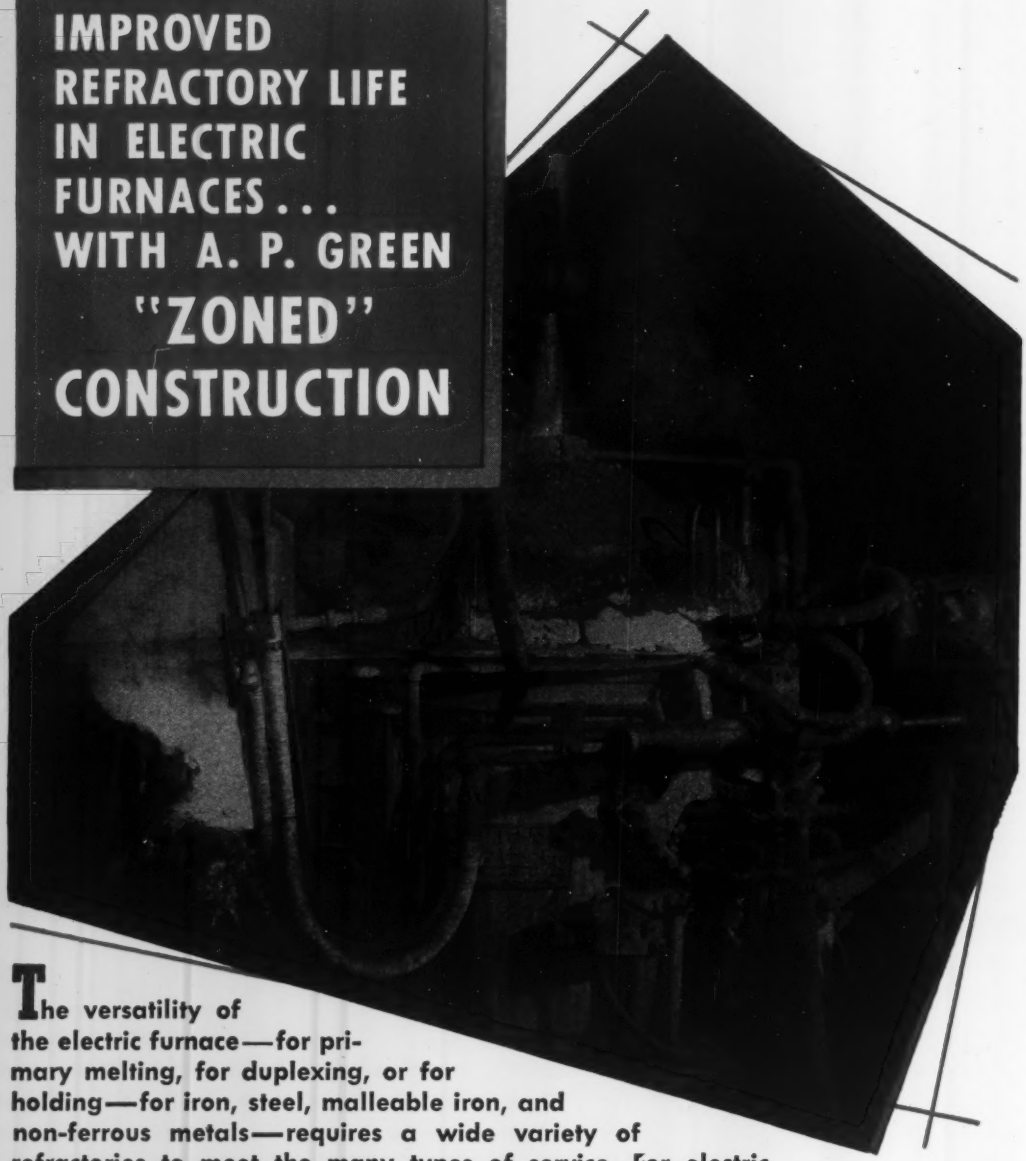
LOW OPERATING COST High efficiency . . . low arc-drop loss. Simple automatic operation . . . freedom from problems of high starting demand and synchronization.

Ignitron Rectifiers were invented by Westinghouse and over 5,000,000 kilowatts have been supplied to satisfied users in industry. For the type — pumped or sealed — best suited for your needs, call your Westinghouse sales representative or write to Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania.

J-15002

YOU CAN BE SURE...IF IT'S Westinghouse

IMPROVED REFRACTORY LIFE IN ELECTRIC FURNACES... WITH A. P. GREEN "ZONED" CONSTRUCTION



The versatility of the electric furnace—for primary melting, for duplexing, or for holding—for iron, steel, malleable iron, and non-ferrous metals—requires a wide variety of refractories to meet the many types of service. For electric furnace roofs, A. P. Green super duty brick, high alumina brick, and monolithic refractories have performed outstandingly in many applications. Even in a specific installation, the service life of a roof may often be materially increased by the judicious combination of several types of refractories. Such "zoned" construction offers maximum economy.

For detailed information on service and specific recommendations —contact your local A. P. Green Representative or write

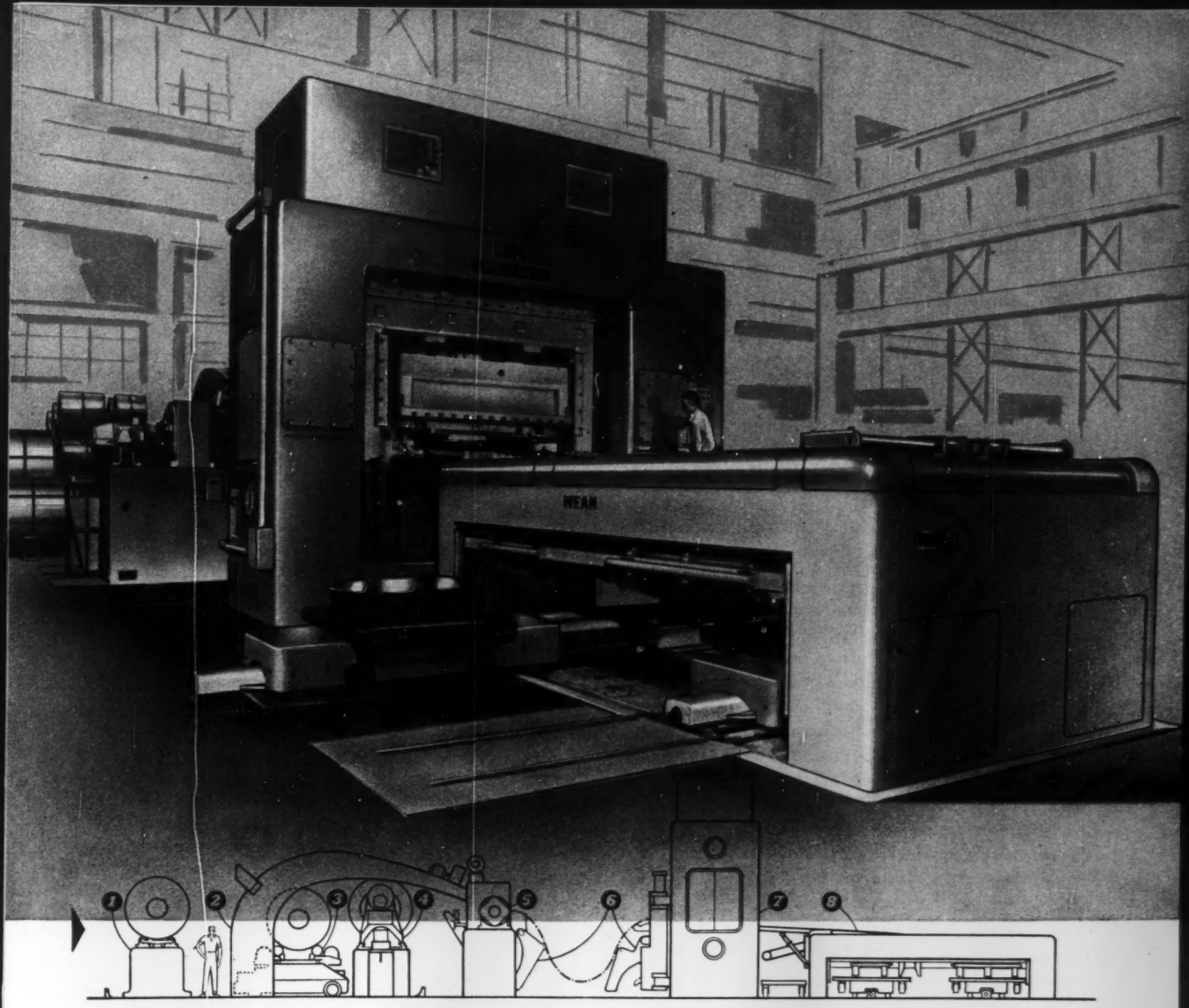
A. P. Green
REFRACTORY PRODUCTS

A. P. GREEN FIRE BRICK CO.

Mexico, Missouri, U. S. A.

Plants: Mexico, Mo.—Woodbridge, N. J.—Sulphur Springs, Texas—Jackson, Oak Hill, South Webster, Ohio—Philadelpphia, Pa.—Troy, Idaho

In Canada: A. P. GREEN FIRE BRICK COMPANY, LTD.
Toronto 15, Ontario



1. Ready stand
2. Threading arms
3. Coil buggy
4. Cone-type Uncoiler
5. Leveler
6. Threading tables
7. "Flying-Press"
8. Automatic Piler

"Flying Press" Production Line

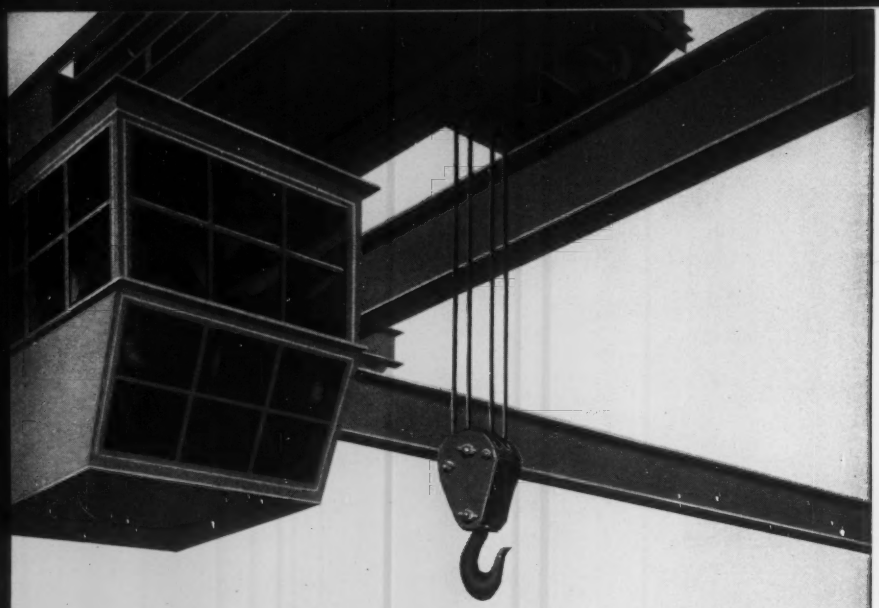
250 ton press line quadruples production of large heavy gauge parts

Dramatic proof of new production horizons is seen in the performance of this 250 ton "Flying-Press" production line engineered by Wean. Large heavy gauge automotive parts, formerly produced on modern presses, at rates up to 20 strokes per minute, are now produced on this Wean line at 90 strokes per minute.

The press is a 250-84-60 "Flying-Press." All components, from ready stand to stacking table, were engineered by Wean to work together as a single unit. Thus, the complete line is capable of producing at maximum press speeds. Consider, for a minute, how such production equipment can lower your per-unit manufacturing costs.

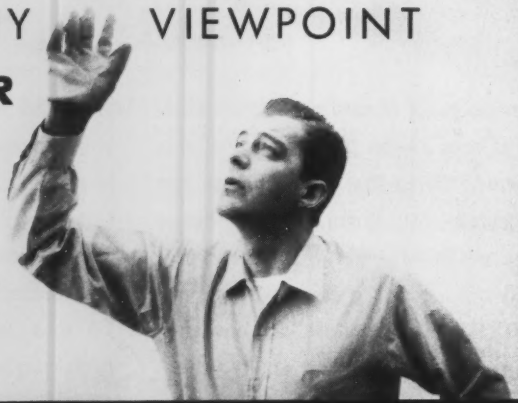
20 tons or 300 tons, whatever your press requirements, you will want the complete story on the "Flying-Press" and related units. Write today for your copy of the Wean "Flying-Press" Brochure.

Wean Equipment Corporation
CLEVELAND 17, OHIO



The **operator** of a Conco engineered Crane can be safer, more productive, less fatigued. There's the safety of true vertical hook travel, of s-m-o-o-t-h travel and lift. There's the safety of design based on deflection limits, often exceeding standard factors of safety. Production is speeded by application-engineering that combines the right speed, span, lift, travel and clearance. Over 37 years experience are behind features which makes Conco Cranes first with operators. Write for bulletin 5000A covering the complete line of Conco cranes, hoists and trolleys.

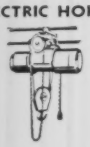
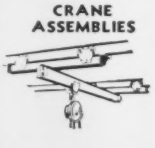
FROM ANY VIEWPOINT
A FINER CRANE



CRANES HOISTS CONCO

Conco Engineering Works
Division of H. D. Conkey & Company
70-14th Ave., Mendota, Illinois

AFFILIATES: Conco Engineering Works–Domestic Heating Equipment • Conco Building Products Inc.,–Brick, Tile, Stone

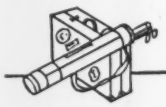
JIB CRANES
ELECTRIC HOISTS 
CHAIN HOISTS AND TROLLEYS
HAND GEARED CRANES
CRANE ASSEMBLIES 

(*Concluded from page* 90)

set are: President, E. J. Parker; vice president and general manager, W. J. Ziegenhein; vice president and treasurer, David Muirhead; vice president and secretary, R. F. Berry; assistant secretary, R. J. Hutchison; assistant treasurer, C. K. Nelson.

International Steel Co., Evansville, Ind., steel fabricator and producer of revolving doors, acquired **Lindsay Structure Inc.**, Skokie, Ill., producer of a light metal assembly used in special types of buildings, industrial dryers, truck bodies and other applications.

Air Products Inc., Allentown, Pa., acquired **Aldan Oxygen Mfg. Co.**, Philadelphia. The property will be under the management of E. J. Rosser.



VACATIONS

Warner & Swasey Co. will close its manufacturing plants in Cleveland and New Philadelphia, O., from Aug. 5 through Aug. 16. Receiving and shipping will be halted at these plants during the vacation period.

United Aircraft Corp.'s Hamilton Standard Division, Windsor Locks, Conn., is closing from July 29 to Aug. 11. With a few exceptions, shipments will not be received or accepted after midnight July 23. The experimental departments will be open, and if orders indicate delivery to departments 15, 23, 33, 35, 67, 73, 79 or 93, shipments should be made as scheduled.

REPRESENTATIVES

Motch & Merryweather Machinery Co., Cleveland, appointed Tornquist Machinery Co., 3838 Santa Fe Ave., Los Angeles 58, Calif., as its representative for the southern California area. Motch & Merryweather builds automatic precision cutoff, milling, heavy drilling and special machinery. Its Avey Division builds drilling machines, way and transfer type machines and other specialized machinery.

Memo to a Man of "Parts"

The number of different parts made from Roebling High Carbon Specialties, Flat Wire and Spring Steel are close to countless.

Some things you can count on, though, are the consistent dimensional and mechanical uniformity you get with any Roebling High Carbon Specialty. They are the qualities that contribute to speeding *your* production and cutting *your* costs.

They are high qualities that make for high values. Next time you need flat wire or spring steel, specify Roebling. Write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

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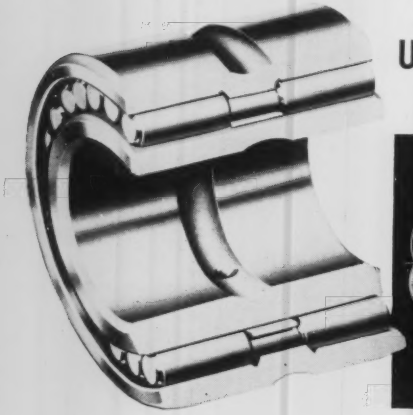
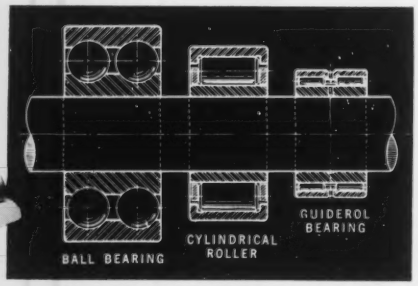
Roebling... Your Product is Better for it

BEARING TIPS by McGill

To pack more performance in smaller space



Use space-saving McGILL GUIDEROL® needle bearings

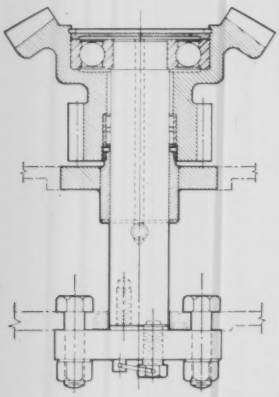


Showing graphically how a McGill GUIDEROL precision needle bearing permits more streamlined designing by supporting comparative loads in significantly smaller radial space than other types of bearings. Bulky and more costly housing space is easily avoided.

The McGill GUIDEROL Bearing combines the inherent high-load capacity of a full complement of full race width rollers with a center roller guiding principle that limits skewing and binding under misalignment. This qualifies the bearing for a whole range of applications that are too heavily loaded for a retainer-type bearing and are subject to the misalignment that precludes use of an ordinary needle bearing. For outstanding performance in small radial space, use GUIDEROL precision needle bearings. Specify the interchangeable sealed SGR series for added protection against contamination.

GUIDEROL® *bearing capacity, space economy proved in power shovel vertical reversing shaft assembly*

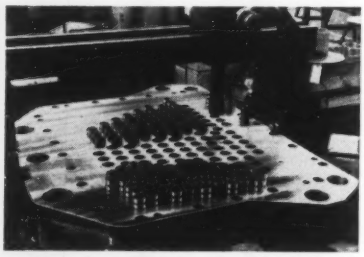
Baldwin - Lima - Hamilton Corp. uses a McGill GUIDEROL bearing, on ½ cubic yard power



shovels, to carry spur pinion loads in the vertical reversing shaft. The high capacity of the bearing in small radial space is an important factor in selection of this bearing. Only 3.75″ in diameter, it has a load capacity of 28,560 lbs. at 100 rpm. In the power shovel application, it supports 14,150 lbs. at 76.3 rpm, which gives a high margin of safety. The center guided rollers also are especially adaptable to a vertical application such as this.

Fact-packed Bearing Catalog

Write for your copy of Catalog #52-A, a 128 page Bearing Selection Guide. It contains vital product information and 30 pages of engineering data.



Multiple spindle drill heads require support of spindles on very close centers

Crowding a great number of drill spindles into a small area, Zagar, Inc., of Cleveland has found the McGill GUIDEROL bearing construction especially suited to the needs of multiple drill head units. The full bearing width rollers provide rigidity and more than adequate load capacity and in a bearing only 1.25″ in bore diameter.

Insure performance with McGILL®

MULTIROL® GUIDEROL® CAMROL
Precision Needle Bearings

McGILL MANUFACTURING COMPANY, INC., 301 N. LAFAYETTE ST., VALPARAISO, INDIANA

STEEL

July 22, 1957

Technical Outlook

BETTER PLATE— The corrosion resistance of bright chrome plate may be improved by a new plating process developed by Wagner Bros. Inc., Detroit. Now being field tested, it uses a zinc plate on the base metal, followed by the conventional copper - nickel - chromium sequence. While there's nothing new about the zinc base plate principle, the secret of the development is that it prevents molecular blending of the zinc and copper layers, a deterrent to commercial use.

WATER BASE PAINT— Another finishing development is announced by Ford Motor Co., Detroit. D. J. Davis, vice president-manufacturing, says a new water emulsion paint containing no inflammable thinners has been adopted for use on automotive parts. The nonsolvent paint consists of particles of pigment which are suspended in water instead of being dissolved in a volatile thinner. Ford is using it at its frame, standard transmission, radiator and parts plants. Mr. Davis says: "The outlook for expanding uses is extremely promising."

DRY HEAT— Dry hydrogen annealing is a critical process for certain electronic components. One manufacturer of electronic gear keeps a running check on the dryness of his annealing furnace atmosphere and the hydrogen in cylinders with a portable instrument made by Consolidated Electrodynamic Corp. It's called a Moisture Monitor.

PORTABLE INSPECTION— The Avco Research & Advanced Development Division, Lawrence, Mass., reports it has improved its quality control efficiency with a portable x-ray unit. It weighs less than 75 lb and can be slung over the inspector's shoulder for field testing of welds, castings or forgings. It works on fabrications of steel or copper up to 1¼-in. thick; aluminum, 3 in.; and magnesium, 4½-in. Called the Baltospot, it is made by Balteau Electric Corp., Stamford, Conn.

NEW ALUMINUM ALLOY— Designated X5454, it was developed by Aluminum Co. of America, Pittsburgh, for use in welded aluminum structures which operate at elevated temperatures. It has high resistance to corrosion and stress corrosion in all temper specifications in the 150 to 300°F range. Applications: Tank trailers and welded dump bodies that transport hot loads; vessels, storage tanks, tubes and piping that handle chemicals at high temperatures.

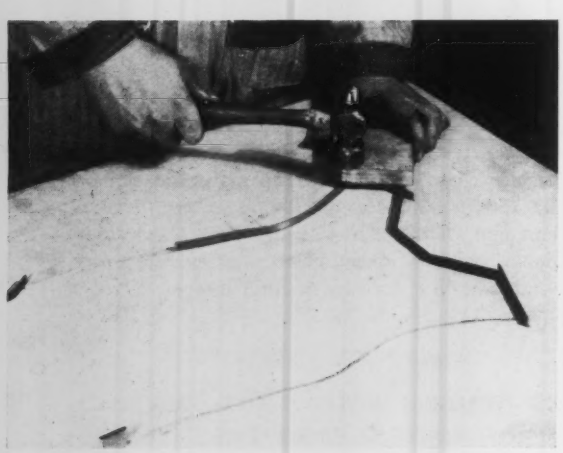
CUTS TITANIUM WEAR— Battelle Memorial Institute, Columbus, O., says galling in titanium can be reduced with chemically or electrochemically produced coatings. Most effective immersion baths contain trisodium phosphate or potassium fluoride with varying amounts of hydrofluoric acid. Heating coatings to 800°F for several hours increases wear resistance and improves adhesion of lacquers and resins.

TESTS SPRING WIRE— The National Bureau of Standards, Washington, has a new machine to fatigue test small diameter spring wire. Results are said to correlate with tests of actual springs. Ends of samples are gripped in heads which turn back and forth through 120 degrees. Amplitude is adjustable. A dial and pointer are mounted 1 in. apart near the center of the wire sample. A counter keeps track of the number of oscillations to failure.

Metalworking Outlook—p. 51 *Market Outlook—p. 135*

1 Scribe pattern outline on plywood

2 Saw plywood to scribed pattern outline



4 Assemble the rule die

5 Saw punch from ¼ or ⅜-in. tool steel and file to fit rule die

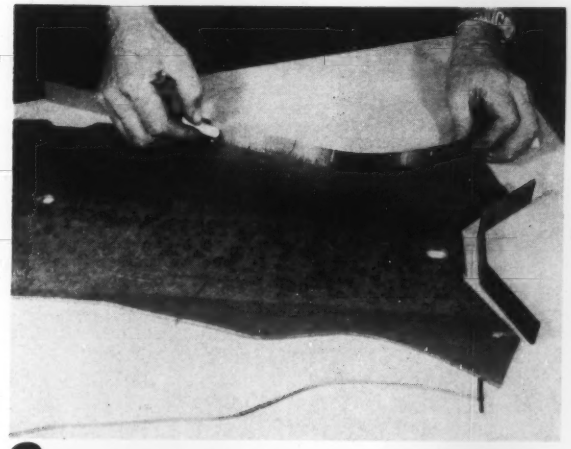
Steel Rule Dies Catch On

MEMO TO MANAGEMENT

These blanking dies are cost cutters. They can be made in 1/10 the time and 1/10 the cost of permanent tools. A. O. Smith Corp. recommends their consideration: 1. When dies are needed in a hurry. 2. When expert diemakers are scarce. 3. When the cost of permanent tools isn't justified by a short production run. 4. When tolerances aren't too tight. Templet Industries Inc., New York, is the licensor.

THE pictures above show how easily steel rule dies are made.

The reasons for their growing acceptance among auto firms and suppliers are indicated in this statement by W. R. Wilson, manufacturing manager, Automotive Division, A. O. Smith Corp., Milwaukee: "At a time of stress in our production schedule, they helped us meet our deadline at nominal cost. The tools gave us outstanding results; some we didn't expect."



3 Bend rule steel to fit pattern

6 Glue rubber to die and punch, set in press. (Punch is on bottom bolster)

Cost Estimates

Straight sections	$ 5 an inch
Curved sections	$10 an inch
Round holes	$10
Irregular holes	$15

Source: A. O. Smith Corp., Milwaukee.

Materials

Plywood
(Maple, 7 ply, type 02, ¾-in.)

Rule Steel
(Single bevel, hardened steel, about ⅛-in. thick)

Tool Steel (¼-⅜-in.)

Mild Steel (¼-⅜-in.)

Rubber Glue
(such as Minnesota Mining's adhesive No. 34-711)

Five Advantages—A. O. Smith reports:

1. One die has made more than 250,000 pieces (0.089 in. cold-rolled steel) and it hasn't worn out yet. Average life is 40,000 to 80,000 pieces.
2. The dies will cut blanks from ½-in. low carbon steel.
3. They cost between $50 and $500.
4. Construction time is short. (A simple example took less than six hours.)
5. Storage is simple. (A rack 1½ x 6½ x 8 ft holds 90 dies.)

Equipment—You need a wood cutting jigsaw, a hand shear for the steel rules, a bender for forming them, a metal cutting band saw and a surface grinder. A filing machine to replace hand work is a finish touch.

Making the Die—A. O. Smith starts with a master blank which has been developed from a tryout of forming tools used in production runs. The blank outline is scribed on the plywood, then drilled to provide access holes for the jigsaw. Width of the saw blade (kerf) depends on rule thickness. Starting from access holes, the outline is sawed out.

Type and thickness of blanking stock control selection of the steel rule. Rule widths are measured in points (1 point is 0.014 in.). Mr. Wilson says he has tried several widths up to 3/16-in. and heights between 61/64-in. and 1¼-in.

Rules are cut and fitted to the contour of the male section of the plywood or to the master blank. They are heat treated at 1450 to 1475°F and quenched in 100 to 120°F oil for 2 minutes. Tempering at 500 to 525°F for 1 hour

makes them comparable to standard die materials (Rockwell C55).

Strippers are made from rubber sheets which are glued to both upper and lower die halves.

The land angle or bevel is ground on the rules by a surface grinder. Experiments have shown that the angle has a lot to do with how long the rules last.

Completed rules are forced into the saw kerf between the male and female plywood sections. That forms the upper half of the die.

Finishing—The punch is made from tool steel. Thickness depends on the gage of blanking stock. A. O. Smith's experience shows that ¼ to ⅜-in. is satisfactory.

Tool steel sections are placed in a press with the upper die half (it holds the steel rules). Closing the press stamps the outline of the rule die into the tool steel. Piercing punches are located and marked.

The punch is sawed to contour and filed to fit the upper die half. Completed sections are hardened and ground, bolted and doweled to mild steel backing plates.

Precautions—You must exercise care in aligning the press. Use guide pins for all but light gage metal. The resiliency of the plywood die plate controls torques that tend to throw the rule outward.

A. O. Smith has made about 200 of these dies—it still uses permanent blanking dies.

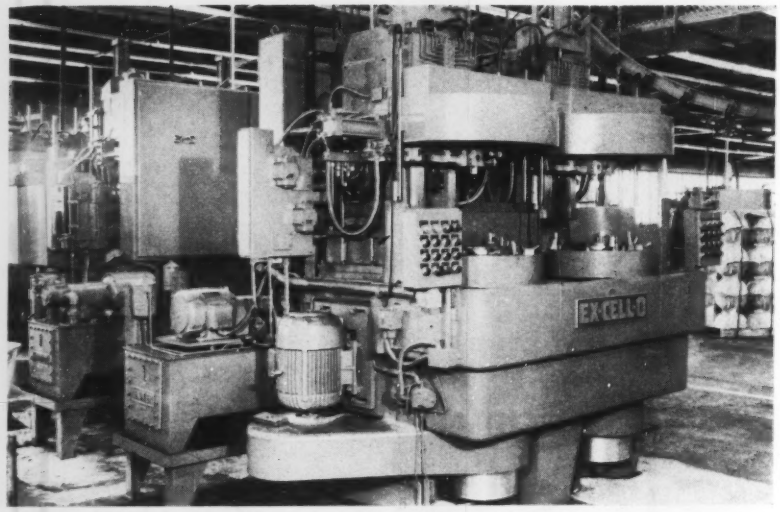
It has reduced costs as diemen have become more familiar with the technique.

Short Cuts — It's sometimes a good practice to cut several parts at once on the same die set. It's also a good idea to allow about 5/16-in. between parts in 1/16-in. stock. Increase or decrease that figure in proportion to stock thickness.

Don't confuse clearances between parts with clearances between holes. In some cases, the edge of one can almost touch the other.

Some firms use steel rule dies to form simple flanges at the end of a cut. Small bevels and flutes are often feasible.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*



Boring Machines Up Output

BORING machines with two independent stations that operate simultaneously are speeding up the production of automotive torque converters in a plant of one of the Big Three auto makers. The machines are manufactured by Ex-Cello-O Corp., Detroit.

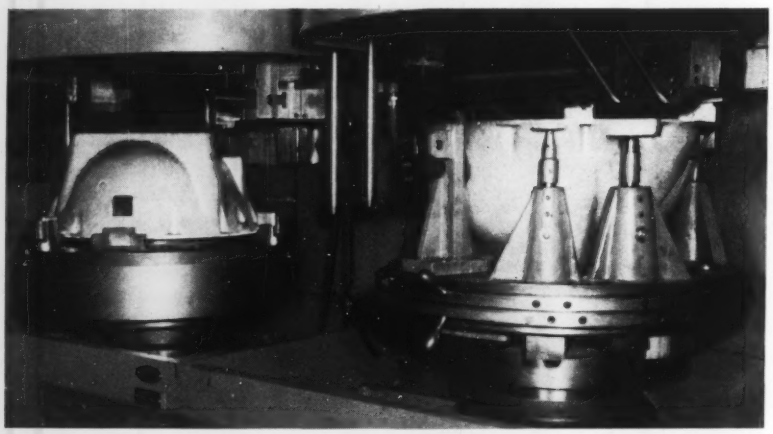
Three are set up to finish face the engine mounting end of the aluminum housing and finish the transmission mounting face, including a 7.003 to 7.006 in. hole.

Step 1—At station 1 of the first two machines, the transmission end of the housing is semifinished in one pass of one tool. Three bayonet clamps, operated by air, hold the workpiece in place.

Step 2—The engine end is finished in one pass of two tools at station 2 of the same machines.

Step 3—A third machine finishes the transmission end. Both stations do the same operation (finish facing, boring and chamfering the end).

The housing is located on two pins and a rest ring where it is held by an air operated chuck. Machining is done by three tools mounted on two tool blocks.



Both stations can be tooled identically or differently

Table 1—Shear Strengths of Joints Brazed with Commercial Alloys

Base Metal*	Brazing Alloy	Type Joint	Atmosphere or Flux**	Brazing Time†	Brazing Temperature °F	Average Shear Strength, psi
FURNACE BRAZED JOINTS						
Ti	Fine Ag	Double lap	Argon	30 minutes	1,780	15,000
Ti-1½Al-3Mn	Fine Ag	Single lap	Argon	5 minutes	1,800	24,700
Ti	85Ag-15Mn	Double lap	Argon	30 minutes	1,800	15,000
Ti	45Ag-15Cu-16Zn-24Cd	Double lap	Argon	30 minutes	1,200	15,300
Ti	61S Al	Double lap	Argon	30 minutes	1,250	11,000
INDUCTION BRAZED JOINTS						
Ti	Fine Ag	Sleeve	Argon	15 seconds		36,000
Ti	Fine Ag	Sleeve	Helium	1 minute		21,800
Ti	Fine Ag	Double lap	Helium	1-4 minutes		21,900
Ti	Fine Ag	Single lap	Argon	15 seconds		30,900
Ti	85Ag-15Mn	Sleeve	Argon	15 seconds		34,000
Ti	85Ag-15Mn	Double lap	Helium	1 minute		20,900
Ti	45Ag-15Cu-16Zn-24Cd	Sleeve	Argon	15 seconds		30,000
Ti	45Ag-15Cu-16Zn-24Cd	Single lap	Argon	15 seconds		35,700
Ti	72Ag-28Cu	Double lap	Helium	1 minute		20,800
Ti	2S Al	Single lap	Argon	15 seconds		14,000
Ti	61S Al	Single lap	Argon	15 seconds		28,000
TORCH BRAZED JOINTS						
Ti	Fine Ag	Single lap	2			31,500
Ti	Fine Ag	Single lap	3			33,000
Ti	Fine Ag	Single lap	2			21,400
Ti	Fine Ag	Single lap	2			17,400
Ti-1½Al-3Mn	Fine Ag	Single lap	2			16,800
Ti-6Al-4V	Fine Ag	Single lap	2			17,200
Ti	Fine Ag	Single lap	2			27,100
Ti	85Ag-15Mn	Single lap	2			18,500
Ti	50Ag-15.5Cu-16.5Zn-18Cd	Single lap	2			25,500
Ti	45Ag-15Cu-16Zn-24Cd	Single lap	2			26,100
Ti	75Ag-25Cu	Double lap	1			22,200
Ti	64Ag-18Cu-18Zn	Double lap	1			20,000
Ti	2S Al	Single lap	2			20,000
Ti	52S Al	Single lap	3			16,000
Ti	61S Al	Double lap	1			20,000

*Ti represents unalloyed commercially pure titanium.
**Numbers represent fluxes listed in Table 4.
†In furnace brazed joints, brazing time includes the time to heat to temperature, brazing time and time to cool. In induction brazed joints, brazing time represents time to heat to temperature and brazing time.

How To Braze Titanium

Most of the common methods will do the job, although induction brazing appears best. Requisites: Proper surface preparation and atmospheres or fluxes

THE high strength-to-weight ratio of titanium alloys has made them valuable aircraft structural materials. But to be of most value in some applications, brazed joints are necessary.

Production brazing of the metal and its alloys has been limited. But researchers have made a number of studies aimed in that direction. The latest is one by W. J.

Lewis, G. E. Faulkner and P. J. Rieppel of Battelle Memorial Institute's Titanium Metallurgical Laboratory, Columbus, O.

Methods—Most common brazing methods have proved satisfactory on a laboratory scale. The requisites are proper surface preparation and proper atmospheres or fluxes.

During brazing, the metal reacts rapidly with practically all brazing filler metals, and intermetallic compounds form in the joint. Excessive amounts of intermetallic compounds lower the shear strength and ductility of the joint. To get strong joints, it's necessary to properly and carefully control the brazing cycle.

Basic—The metals to be joined and the filler materials must be free of oil, paint, scale and other foreign materials.

Standard cleaning procedures generally are adequate. As-received (scalefree) material is degreased, given an acid pickle and wire brushed. The pickling solutions contain about 2 per cent hydrofluoric acid and 10 to 47 per cent nitric acid.

Scale—Titanium that has been heated to relatively high temperatures in air has heavy scale which must be removed. Mechanical cleaning (sand, grit or vapor blasting) or chemical cleaning (oxidizing molten salt baths) may be used. Descaling of titanium usually is followed by standard pickling and wire brushing.

Because the metal combines readily with active elements and compounds, it must be protected from air and other active gases during brazing. Inert atmospheres and fluxes will do the job.

Atmospheres—Helium and argon are used. They occasionally contain water vapor that has to be removed, but normally they are usable as received.

The gases have these important advantages: 1. Parts do not require postbraze cleaning. (In applications where flux removal is impossible, such as brazing of honeycomb sandwich structures, this is highly important.) 2. The gases prevent formation of scale on the assembly and may permit finish machining before brazing. 3. Slag entrapment in the joint is not a problem.

Titanium alloys can be brazed in vacuum. Removal of atmospheric gases and those evolved during the cycle provides good brazing conditions and eliminates postbraze cleaning. However, elaborate vacuum equipment and retorts heavier than those needed to braze in inert-gas atmospheres are required.

Fluxes—Surface films can be removed and further oxidation prevented by using a flux. To do this, the flux must be in contact with all surfaces in the joint. Many experimental fluxes have been tried; those which seem best are shown in Table 4.

Flux 1 is a commercial material which is adequate for brazing with the low-melting-point silver alloys. The other two are experimental and are more suitable than the commercial flux for brazing with fine silver because they retain their fluxing properties to higher temperatures.

When fluxes are used, joints must be cleaned after brazing to avoid corrosion from the active chemicals in the flux and to improve joint appearance. The flux residue usually can be removed by washing the joint in water and wire brushing.

Brazing Alloys—Of all the proprietary brazing alloys, fine silver and the silver-base alloys are preferred. Fine silver wets and adheres to titanium readily and is free flowing above 1760°F.

Silver reacts with titanium during brazing to form the intermetallic compound TiAg, but it is ductile and less harmful to the properties of brazed joints than are some other compounds. The amount of TiAg formed depends on time and temperature, variables which affect the strength of joints brazed with silver.

Silver Base—These alloys generally do not wet titanium as readily as fine silver. They also react with titanium and form intermetallic

Table 2—Some Experimental Brazing Alloys*

Nominal Composition of Brazing Alloy, (Balance Titanium)	Approximate Brazing Temperature °F	Shear Strength psi
33% Cu	1,780	50,600 >48,100 41,600
16% Cu	2,580	>47,600 >47,500 >51,400
25% Ag-17% Cu	1,950	43,500 >57,000 56,100
12% Ag-8% Cu	2,400	42,300 >62,600 >49,500
15% Mn-10% Ag	2,400	>57,000 >50,600 >50,200

*Base metal is commercially pure titanium; joints were induction brazed.
> indicates failure was in the base metal and that the joint was stronger than the value shown.

compounds that are brittle and have more pronounced effects on joint properties than TiAg.

Although some of the silver-base alloys are suitable for many applications, the silver content should be at least 45 per cent and the copper content less than 20 per cent. The advantage of the silver-base alloys is that they permit lower brazing temperatures (1145 to 1650°F) than fine silver (1780°F).

Copper, Aluminum—Copper also forms an intermetallic compound with titanium, plus a low-melting point eutectic (about 1600°F) that erodes and undercuts the base metal during brazing.

Aluminum and some of its alloys wet and adhere to titanium readily. The metal reacts with titanium to form the intermetallic compound $TiAl_3$, which is brittle. Some studies have shown that joints made with filler alloys of aluminum have higher shear strengths than those made with commercially pure aluminum.

Nickel, Titanium — The use of commercial nickel-base alloys has been limited. Some success with experimental alloys of this type has been reported.

Several experimental titanium-base alloys have been used as filler metals at brazing temperatures of 1800 to 2500°F. Most of them wet and flowed on the titanium, but some caused undercutting of the base metal. The experimental alloys may be especially applicable for brazed joints that require corrosion properties similar to those of the base metal.

Furnace Brazing—Titanium can be brazed in a furnace, but it is not an entirely satisfactory method because of the long brazing cycles normally used. A considerable amount of compound formation results.

If high strength joints are required, the brazing cycle must be considerably shorter than that used for other metals. The times for heating to temperature are not critical, but the time at temperature and the cooling time should be as short as possible.

Shielding—In furnace brazing, inert atmospheres are satisfactory for shielding. Flux also can be used in some applications to shield the joint.

Generally, joints are heated about 50°F above the liquidus temperature of the brazing alloy for 5 minutes. With pure silver as the filler metal, the joints should be brazed at only 20°F above the melting point for 2 minutes because of the excellent wetting characteristics of silver on titanium. If temperature or time is greater, most of the silver will flow over the surface of the titanium, leaving insufficient silver to produce a good joint.

Induction Brazing—This method is recommended for production work because: 1. High temperatures can be reached rapidly. 2. The time at temperature can be controlled easily. 3. The cooling cycle is fast.

Inert-gas atmospheres are satisfactory. Joints may be brazed in enclosed tubes fitted inside the induction coil or in bell jars or retorts which contain the induction coil. Flux shielding also can be used.

Torch Brazing — Satisfactory joints have been oxyacetylene brazed by using commercial brazing alloys and titanium fluxes. Although cycles are short and strong joints can be obtained, titanium cannot be torch brazed with the ease that most metals can; the operator must be skilled. A slightly reducing flame is used.

Best results are obtained when the brazing alloy is added at the right instant. Two techniques can be used: 1. Preplace the filler metal and heat the back of the joint until the brazing alloy flows into the joint. 2. Hold the brazing alloy in contact with the titanium near the joint during heating until the brazing alloy flows.

If techniques are used where the filler metal is not in contact with the joint at all times, overheating usually results and a crust forms on the flux which prevents the filler metal from wetting the titanium.

Resistance Brazing—You can use this method without flux or protective atmospheres. But it is limited to joints which have relatively small areas.

The disadvantages: Nonuniform heating, forging of titanium at the joint, and braze metal squeeze-out. The problems may be overcome under the proper conditions.

Tungsten Arc — Tungsten electrode arcwelding torches also may be used. The method has been used to provide a seal for a special titanium assembly and in making single lap joints. Techniques are the same as those used in making a fillet weld except that current settings are just high enough to melt the brazing material and not the base metal.

Some brazing alloys are relatively easy to apply to titanium with the tungsten electrode torch and should provide an adequate seal for some applications. The deposit on

Table 3—Rupture Properties of Torch-Brazed Joints

Brazing Alloy	Temperature, °F	Stress in Joint, psi	Stress in Sheet, psi	Fracture, hours
75Ag-25Cu	600	2,000	8,000	499
		4,000	16,000	500
		6,000	24,000	21.5
		8,000	32,000	0.05
45Ag-15Cu-15Zn-24Cd	800	500	2,000	24
		1,000	4,000	33
		2,000	8,000	0.11
		4,000	16,000	0.05

the joint looks like a weld bead.

Shear Strengths—Joints brazed with fine-silver filler metals have the highest strength and most apparent ductility. Strong joints also can be made by using an 85 Ag, 15 Mn brazing alloy (see Table 1).

Filler metals containing less silver and more alloying elements (such as 45 Ag, 15 Cu, 16 Zn, 24 Cd) generally exhibit less strength and ductility than the high-silver alloys.

Methods—Joints made with the shortest brazing cycles have the greatest strength. Induction brazed joints are much stronger than furnace brazed ones made with similar filler alloys.

Although flux inclusions usually are present in torch brazed joints, they generally are stronger than furnace brazed ones, but not as strong as those induction brazed.

Experimental Alloys — Several experimental alloys that produce stronger joints than commercial filler metals have been developed.

Sleeve-type joints furnace brazed in a 10-minute cycle with a nickel-base alloy (52 Ni, 28 Ti, 15 Cu, 5 Co) showed shear strengths which averaged 43,000 psi—considerably higher than joints furnace brazed with commercial silver-base alloys. Failure was in the titanium base.

Titanium Base—Shear strengths of single lap, induction brazed joints made with five experimental titanium-base alloys are shown in Table 2. They are higher than similar joints brazed with commercial alloys.

The strengths of the joints increased with decreasing alloy content in the brazing metal. However, the amount of alloy addition controls the melting temperature of the filler metals and must be high enough to keep the brazing temperature below 2500°F.

Other Metals—One of the important applications will be in joining titanium to other metals. Most of the work in this area has been with mild and stainless steels. Torch and induction brazing techniques have been studied.

In torch brazing titanium and steel, the available fluxes generally do not work well for both metals. Higher strengths are obtained when an overlay of brazing alloys is placed on one of the metals.

Table 4—Fluxes for Torch Brazing

	Composition, Per Cent								
Flux	$CuCl_2$	AgCl	KF	NaF	LiF	LiCl	NaCl	$SrCl_2$	KCl
1*	1		46	2		50		1	
2		10			9		45		36
3	1	4	50		45				

*Dry composition of a commercial titanium brazing flux.

Mild Steel — To braze titanium and mild steel by oxyacetylene torch: 1. Overlay the steel with a filler metal of 45 Ag, 15 Cu, 16 Zn, 24 Cd, using Handy flux. 2. Braze the titanium to the coated steel with the same alloy, using flux 2 (see Table 4).

Shear strengths averaging 22,000 psi can be obtained in single lap joints. Other methods of coating the mild steel, such as plating and other brazing alloy coating combinations, may produce higher strength joints.

Stainless—Joints between titanium and stainless steel may be made with the same brazing alloys and procedures. An alloy of 45 Ag, 15 Cu, 16 Zn, 54 Cd can be used to overlay strips of stainless steel.

The precoated strips are brazed to titanium, using titanium flux (see Table 4) and the same brazing alloys. Single lap joints with shear strengths averaging 17,000 psi have been obtained by this method.

Induction Heating—To induction braze titanium-stainless joints, the steel should be overlaid with a brazing alloy since stainless is not readily brazed in an inert atmosphere without fluxing. Mild steel can be brazed to titanium in an inert atmosphere without fluxing.

In induction brazing titanium and mild steel, shear strengths of about 26,000 psi can be obtained when an alloy of 45 Ag, 15 Cu, 16 Zn, 24 Cd is used. You can get the same result with fine silver.

To induction braze stainless and titanium, overlay the stainless with an alloy of 45 Ag, 15 Cu, 16 Zn, 24 Cd and use Handy flux. Braze the precoated stainless to the titanium in argon, using the same alloy. Shear strengths of single lap joints average 28,000 psi.

Joints also can be made between titanium and stainless which has been overlaid with an alloy of 85 Ag, 15 Mn. With fine silver as the filler metal, shear strengths of single lap joints have averaged 32,000 psi.

Future—Much is unknown about brazing titanium and its alloys. An important area in which much work will be done is the applicability of brazing processes for production assemblies. Data on the service performance of brazed assemblies are needed.

Present fluxes are satisfactory for torch brazing small laboratory specimens but may not be adequate for brazing assemblies under less ideal conditions.

The shear strengths that can be obtained in joints between titanium and other metals are probably high enough for many applications. With the development of new and improved techniques, the shear strengths will rise, and the brazing of titanium will find greater application.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

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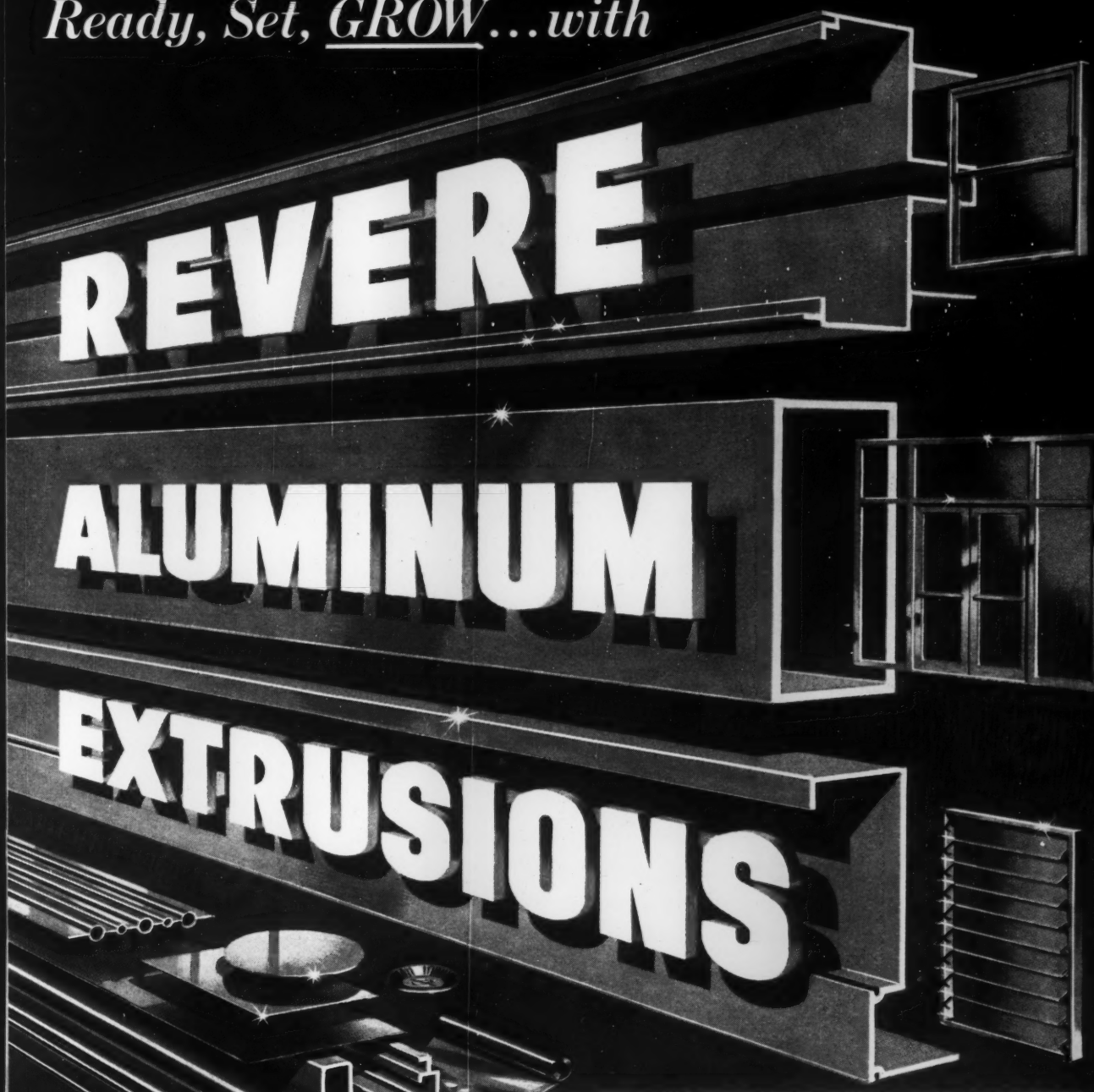

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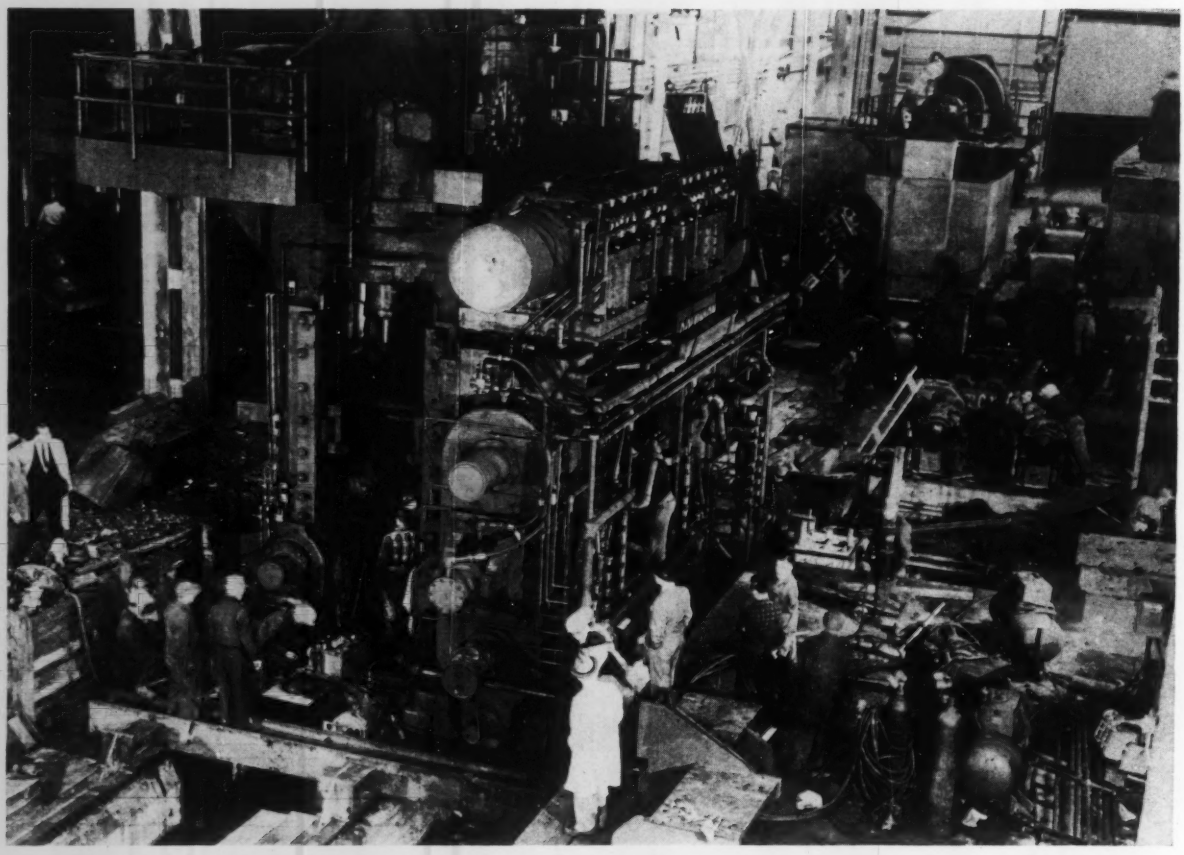

Sliding the new universal slabbing mill into place at Dofasco

Mill Changes Break Record

A newcomer to steel plant construction employs unusual methods to cut down time. Heavy subassemblies built off site are part of speed picture

UNORTHODOX construction cut down time in the replacement of a slabbing mill to 12 days. The job ordinarily takes at least three weeks.

New methods made it possible to build a blast furnace and get it in full blast in 306 days. Blast furnace construction usually takes at least 14 months.

The crew building a continuous galvanizing line raced a fruit crop ripening early—and won.

Responsible for breaking those records at Dominion Foundries & Steel Co. Ltd., Hamilton, Ont., is H. K. Ferguson Co., Cleveland, a newcomer to steel mill construction. It worked jointly with Patterson-Ewerson-Comstock International.

Resources—Although Ferguson has been quoting on steel mill jobs for only a couple of years, its experience in other construction fields ranges from atomic energy plants to grain elevators. It has the advantage of being able to call on its parent corporation, Morrison-Knudsen Co. Inc., builder of big dams, bridges and tunnels, for some unusual heavy equipment.

In building the Dofasco blast furnace (hearth diameter is 20 ft 9 in.), Ferguson engineers assembled the skip incline on the ground, complete with electrical conduits, steam and air piping, stairways and platforms. Then they teamed two, 100-ton crawler cranes to lift the 386,000-lb package into position in one piece.

The bustle pipe, a mere 40 tons, was put up in one piece. So was the downcomer. Ore pocket side and leg subassemblies weighing 100 tons were lifted into place. The furnace mantle was put up conventionally, one ring at a time, but according to J. P. Grilli, Ferguson's special representative,

(*Please turn to page* 113)

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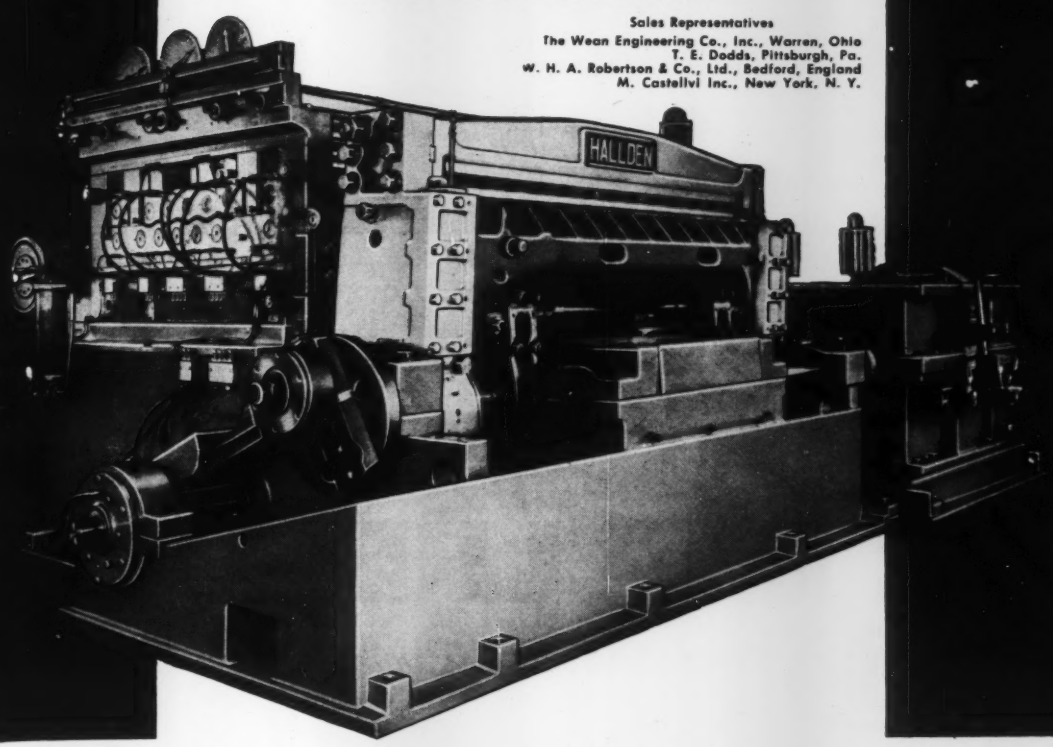

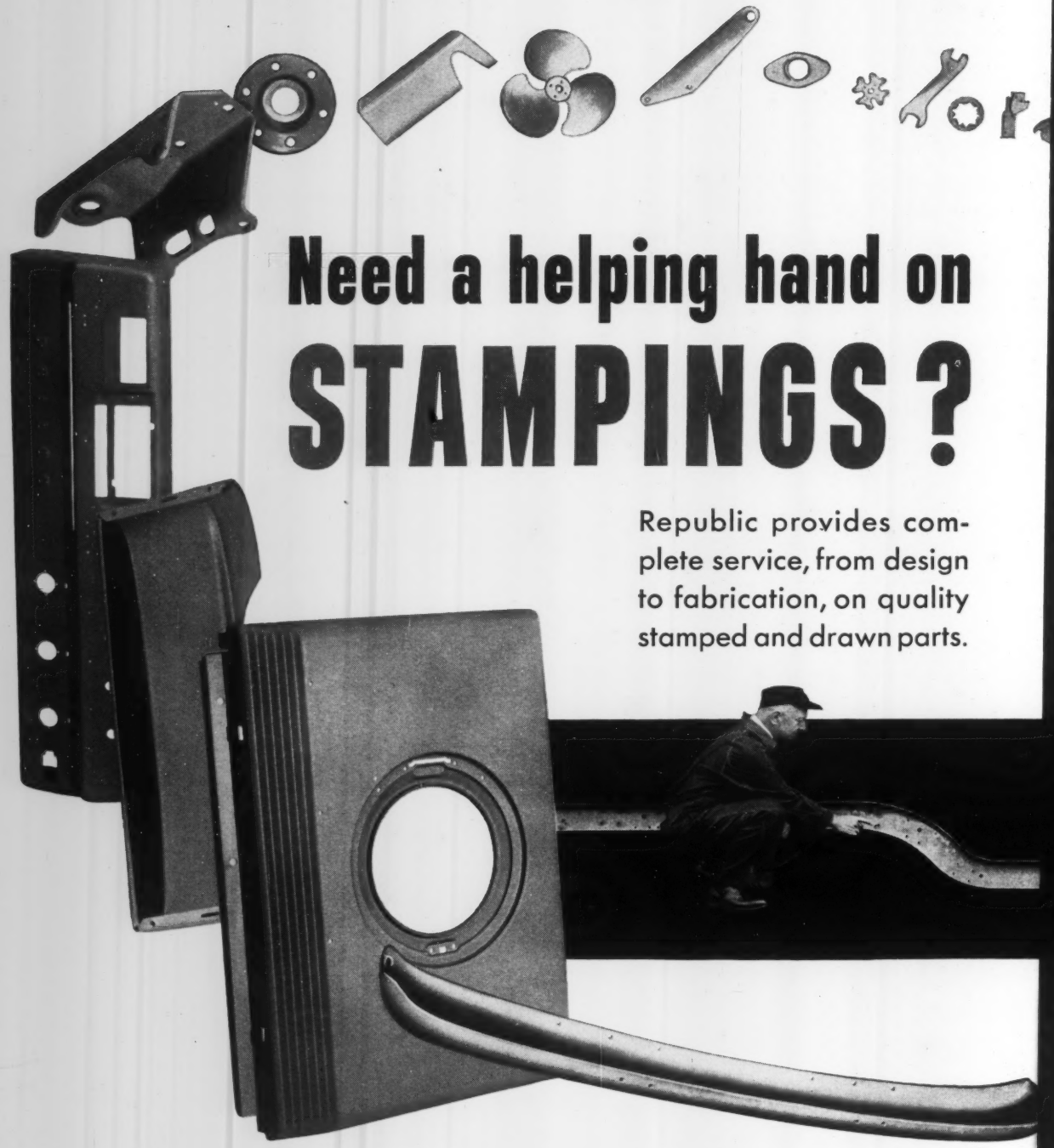

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...it contains detailed information and photos on Republic's Pressed Steel Division production facilities—plus various parts that Republic has made in both large and small quantities. It may give you an idea on parts that we can produce for you.

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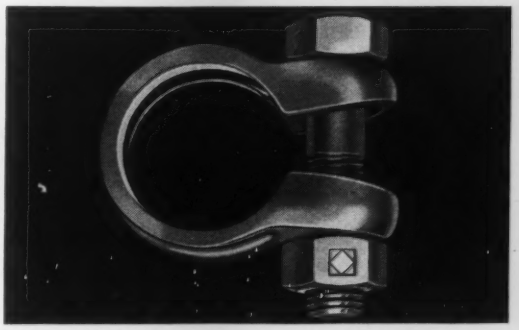
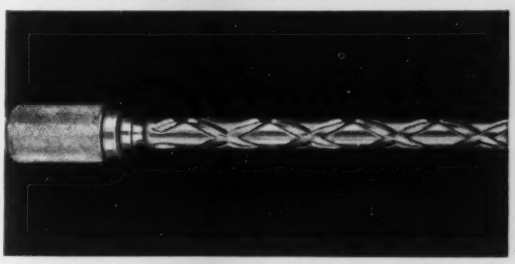


REPUBLIC NYLOK® NUTS proved to be the solution for fast production and plus-safety features in the manufacture of an automobile steering mechanism, shown above. Nylok nuts are ideal for automatic feeding, and give a permanent, vibration-proof lock. Easy adjustment and re-use are assured by permanent resiliency of the nylon pellet.

REPUBLIC ELECTRO PAINTLOK made it possible to double painting production with existing facilities. By using electro paintlok, Temprite Products Corporation, manufacturer of water coolers, eliminated a primer coat—one painting and drying operation—yet still maintained a high-quality, long-lasting finish.



REPUBLIC METALLURGISTS, working closely with Yankee Tool, Inc., engineers, came up with the exact type of Republic Cold Finished Steel for this spiral driver. Precise size and cross section, excellent physical properties, and a high degree of machinability meet the requirements of Yankee engineers. The continuing success of the "Yankee" Spiral Driver is evidence of Republic quality steels.

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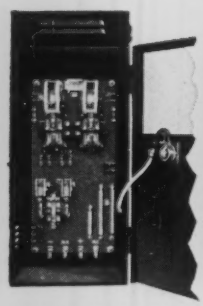
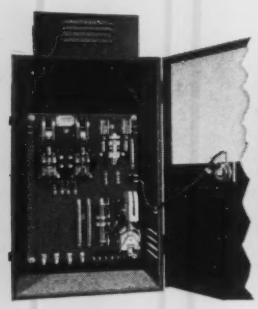
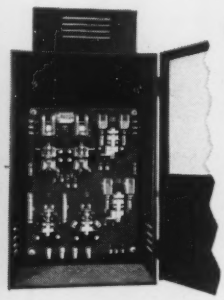


Type AD Standard Controller for single magnets or two magnets in parallel. Exclusive, adjustable discharge for different type loads



Booster Controller gives increased pull-away power from pile, then carries load at reduced current



High Speed Release DLM-335-A Controller reduces the discharge time of deep-type magnets 50%

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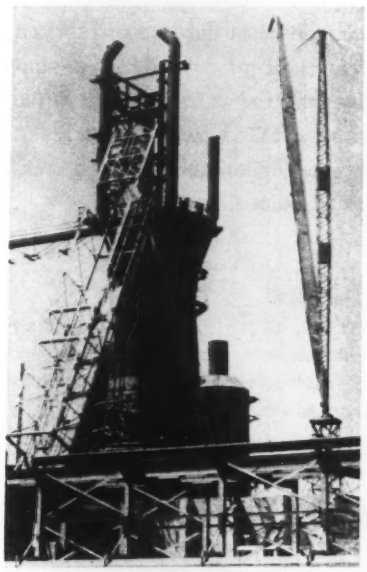
they'll be put up three or four rings at a time on the next job.

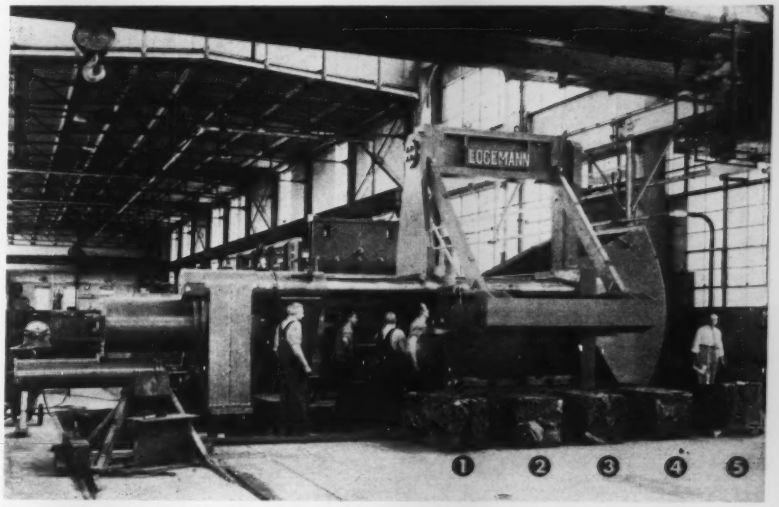
Slabbing Mill—Behind the fast job were six months of planning and preliminary construction. A permanent steel form for the concrete base was constructed off the site. To the form were attached all the reinforcing steel, anchor bolts, ventilation ducts, scale sluice trough, piping and conduit that would be later buried in concrete. The new, 46-in., 2-high universal mill was constructed on temporary foundations 50 ft from the point of eventual installation.

When the old mill had been removed and the spot for the new foundation cleared, the permanent forms were dropped into place and poured with fast setting, high strength concrete. Piping and electrical connections had already been installed beside the old mill. Later, the 650-ton mill was slid over lubricated polished rails to the permanent site.

The projects are part of Dofasco's $88-million expansion program. It includes a 56-in., cold-reduction mill (installed in a manner similar to the slabbing mill), an automatic continuous galvanizing line, an electrolytic tinning line, a continuous electric annealing line and the 200-ton a day blast furnace.



Hoisting the skip incline in one piece for the Dofasco blast furnace



The Model 4000-P press has just completed final tests

Baler Handles Bulky Scrap

Built for a large eastern scrapyard, the press also is suitable for metalworking plants that have bulky scrap in large tonnages. Bale densities are exceptionally high

YOU CAN bale up an automobile easily in the new scrap press Logemann Bros. Co., Milwaukee, has just built for a large eastern scrapyard. The test bales in the photo are:

1. Bulky miscellaneous yard scrap—1660 lb.
2. Two burned and stripped auto bodies—1900 lb.
3. Two smaller burned and stripped auto bodies—1740 lb.
4. One large unburned auto body, with engine and transmission removed—2280 lb.
5. One unburned auto body, with engine and transmission removed —2020 lb.

The press box is 20 ft long, 7 ft wide and 5 ft deep. Compressed bales are 24 x 24 in. The third dimension depends on the kind and quantity of scrap charged.

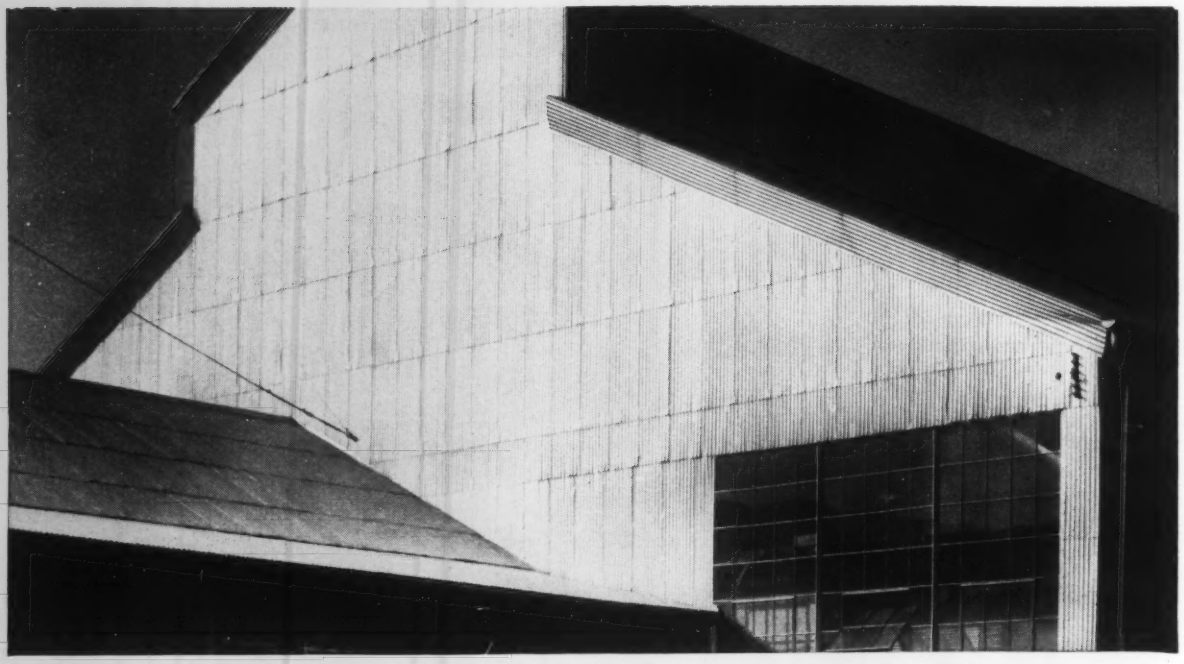
How It Works—When the press box is loaded, the hydraulically operated cover slides into place and locks. The gathering ram compresses the scrap from 20 ft to 2 ft at the front end of the box.

The intermediate ram moves across the width of the box, squeezing the scrap from 7 ft to 2 ft. The finishing ram moves upward, compressing the scrap vertically into a dense bale, ready for remelting.

When the cover is withdrawn, the finishing ram raises the bale level with the top of the box to allow the cover to push it off for loading into cars.

Pressures — Two 150-hp pumps generate hydraulic pressure to operate the press rams. The first ram operates at 120 psi, the second at 1000 psi and the third (finishing ram) at 2400 psi.

The hopper can be filled with miscellanous scrap while the press is making a bale, then dumped quickly into the box as soon as the preceding bale has been discharged.



PAINT STAYS ON the metal of this galvanized building. The roofing and siding were treated with ACP Lithoform before painting. No peeling of the paint finish has occurred and it will last much longer.

ACP Lithoform® REDUCES MAINTENANCE COSTS OF GALVANIZED IRON STRUCTURES— FIRMLY ANCHORS PAINT TO THEM

LITHOFORM PROCESS	Type of Coating	Metal Treated	Object of Coating	Method of Application	Government Specifications
LITHOFORM 32	Zinc phosphate	Zinc or cadmium	Improved paint adhesion	Spray Dip	MIL-T-12879 (QMC) Type 1, Class 1 QQ-P-416, Type 111 QQ-Z-325, Type 111
LITHOFORM 40	Zinc phosphate	Zinc and steel when combined	Improved paint adhesion	Spray Dip	MIL-T-12879 (QMC) Type 1, Class 1 PA-PD-191 (Rev. 1) (purchase description) QQ-P-416, Type 111 QQ-Z-325, Type 111
LITHOFORM Z	Amorphous chromate	Zinc or cadmium	Improved paint adhesion corrosion resistance unpainted	Spray Dip	MIL-C-17711 (N Ord.) MIL-T-12879 (QMC) Type 1, Class 2; Type 11 QQ-P-416, Type 11 QQ-Z-325, Type 11 U. S. A. 57-0-2C Type 1 (plating)
LITHOFORM 2	Zinc phosphate	Zinc	Improved paint adhesion	Brush	

There's no peeling of paint from galvanized iron, other zinc surfaces, or cadmium when they are first treated with Lithoform. This ACP product forms a non-metallic coating which becomes an integral part of the surface, resulting in an excellent bond for the paint finish and preventing any undesirable chemical reaction between metal and paint film.

LEARN MORE ABOUT ACP LITHOFORM. Bulletin 1481 describes the various types and gives helpful information which will help you select the proper one for your particular application. Write for your copy today

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TYPE AND GRADES	DESCRIPTION	HARDENING RANGE	QUENCH	TEMPERING RANGE	USEFUL HARDNESS
W1 Grade 1 Columbia SPECIAL	Best quality water hardening tool steel — meets all metallurgical tests	1420° F. to 1530° F.	Water and Brine	350° F. to 500° F.	67/59 Rc
W2 Grade 2 VANADIUM EXTRA	Vanadium treated modification of Columbia EXTRA, fine grained, tough, long wearing carbon tool steel	1425° F. to 1500° F.	Water and Brine	350° F. to 500° F.	64/58 Rc
W5 Grade 2 WATERDIE EXTRA	Chromium alloyed Columbia EXTRA for increasing depth of hardness and wear properties	1475° F. to 1525° F.	Water and Brine	350° F. to 500° F.	65/56 Rc
W1 Grade 2 Columbia EXTRA	Extra quality straight carbon tool steel — meets hot-etch and hardenability tests, wide range of uses	1420° F. to 1550° F.	Water and Brine	350° F. to 550° F.	65/57 Rc
W1 Grade 2 Columbia EXTRA HEADERDIE	Selected carbon with controlled hardenability to meet severe physical requirements of cold heading Metallurgically controlled for center soundness	1470° F. to 1550° F.	Water and Brine	400° F. to 530° F.	63/58 Rc
W2 Grade 3 VANADIUM STANDARD	Vanadium treated Columbia STANDARD — a shallow hardening fine grained tool steel for general purposes	1420° F. to 1470° F.	Water and Brine	400° F. to 550° F.	63/56 Rc
W1 Grade 3 Columbia STANDARD	A good quality reliable straight carbon, general purpose tool steel for short run tools not requiring the high physical properties	1420° F. to 1470° F.	Water and Brine	400° F. to 550° F.	63/56 Rc

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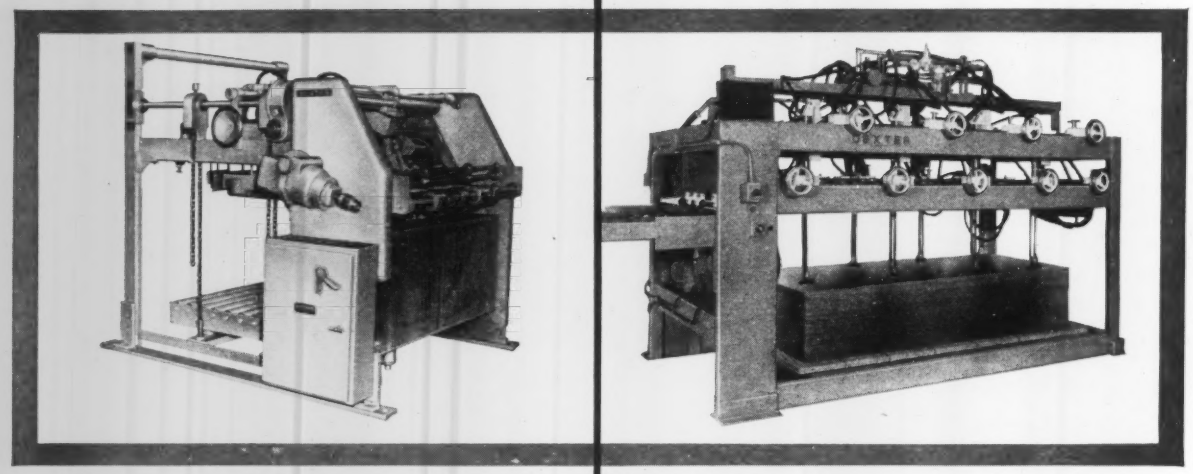

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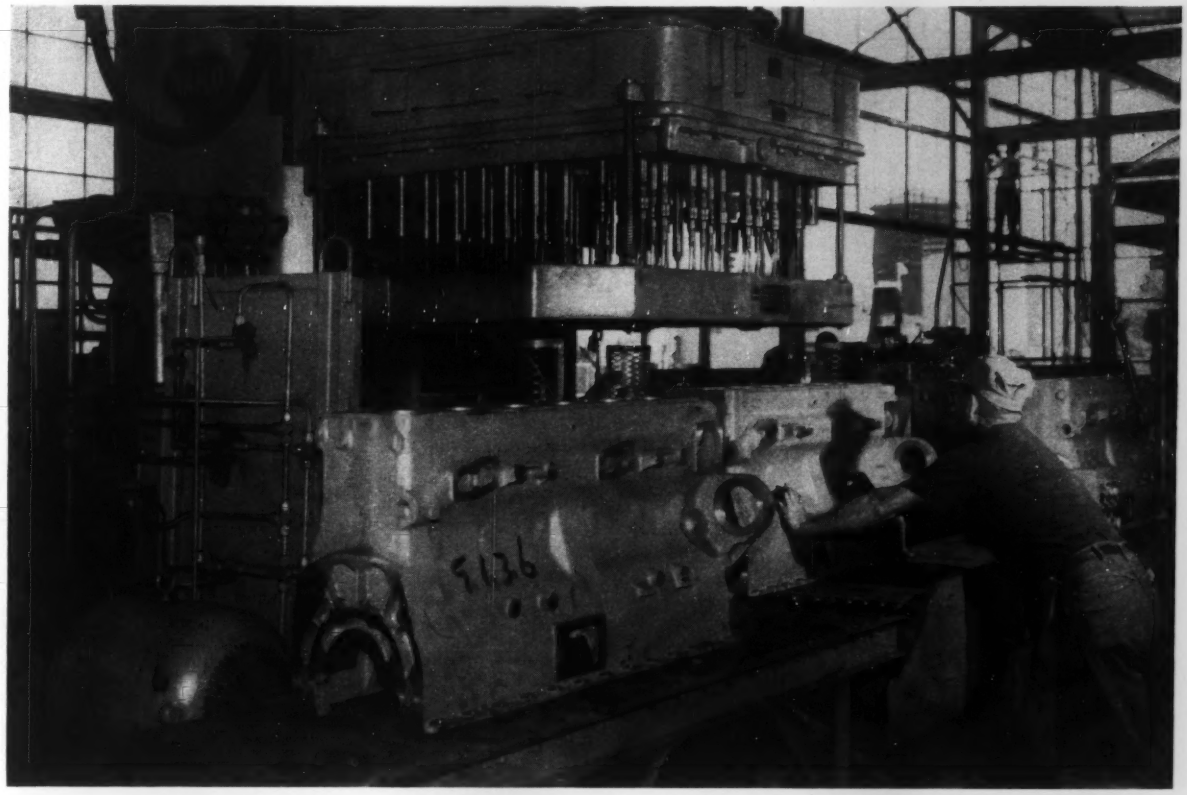


Operator pushes an NH series diesel engine block off the roller conveyor line onto the drilling and tapping machine table

Cummins Puts In Mid-Automation

Integrated with the machine tools, gravity conveyors ease handling of heavy blocks. Homemade rollover fixtures dump chips and change block position

"WE'RE FIGHTING the natural inclination to just grow like Topsy with programmed equipment and plant additions," explains a production supervisor at Cummins Engine Co. Inc., Columbus, Ind.

Cummins is on a four-year growth program aimed at keeping pace with sales that have shot from $40 million in 1951 to over $100 million last year. In 1956, executives O.K.'d the purchase of about $6 million worth of new production equipment. They had spent nearly $3 million in 1955.

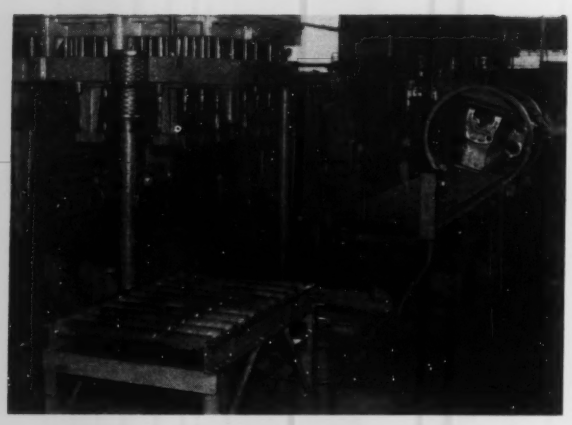
Block Lines—A good example of their programmed expansion is the department with two production lines that turn out diesel engine blocks. They are integrated with assembly and tailored to fit the production picture when expansion is complete.

Making the transformation from "a machine shop to a production line," engineers integrated conveyors and block-handling devices with machines. Result: Mid-automation, a combination of mechanization and manual operations to get minimum cost with optimum production rates.

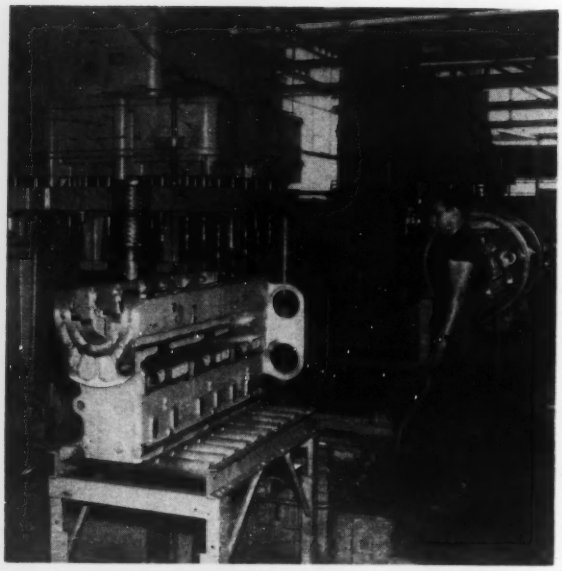
Jobs—The department has two production lines, one for the company's JT and JS series blocks, the other for the NH series. J blocks weigh 310 lb. The other line handles 4 and 6-cylinder blocks, plus horizontal and supercharged blocks. Each (they weigh as much as 630 lb) takes slightly different tooling.

The J line, with only one block to run, has more automatic devices than the other. It uses ten operators. The NH line has 20. Output of each line is geared to 75 blocks a day.

Handling—The key to the operation is a set of roller conveyors that move blocks through the two

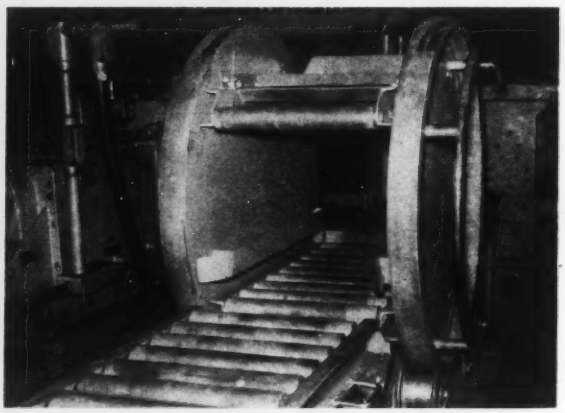


In the machine at rear, 42 holes in the bottom of the block are drilled, reamed and counterbored. The block is inverted and brought to the machine in the foreground



This second machine processes 56 holes in the top of the block. A finished part waits at the end of the line

Here's a close-up of the Cummins-built rollover fixture. The operator kicks a foot pedal to unlock it before the fixture is rolled



This rollover fixture also turns the block end for end

machining lines. Gravity feed is used where possible. Conveyors carry the blocks past the machine tools.

When blocks must be inverted or turned end for end, the operator puts them on simple, Cummins-built rollover fixtures. Placed on the lines, the fixtures are made from rail sections, welded into circles. They have a conveyor section at both top and bottom. Rail sections ride on rolls and are hand turned by the operator.

Integration—Machine tools are integrated into the conveyor lines. Drilling and tapping machines, for example, have roller-type loading platens that take blocks off the line, into the machine and return them to the line.

Built by National Automatic Tool Co. Inc., Richmond, Ind., the platens are hydraulically operated. After the blocks are moved into the machines, jacks pick them up on pins, locating them for the machining operation.

After machining, the jacks drop and the block is automatically returned to the conveyor line, ready for the next operation.

Cummins people feel this combination of automation and manual handling is ideal for their level of production. It gets rid of most of the lifting and manipulating that used to be necessary. Also, the initial cost was low enough for a semi-job shop operation to justify it.

Cummins engineers have found that it often pays to use special machine tools with in-built flexibility rather than straight standard machines. All drilling and tapping are now done on specially tooled machines.

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Red Lion Cabinet Company requires quality cold rolled sheet to meet the high standards set for the company's end product.

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- Alan Wood cold rolled sheet has a good clean surface, resulting in a superior cabinet finish.
- Alan Wood cold rolled sheet forms easily.

Qualities like these are the direct result of close control in Alan Wood's modern mills.

Alan Wood cold rolled steel may also help you improve profits. Write Marketing Division, Department CR-S70 for full information.

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Iron powder
Crushed stone
Sand

COKE
Foundry, industrial & metallurgical

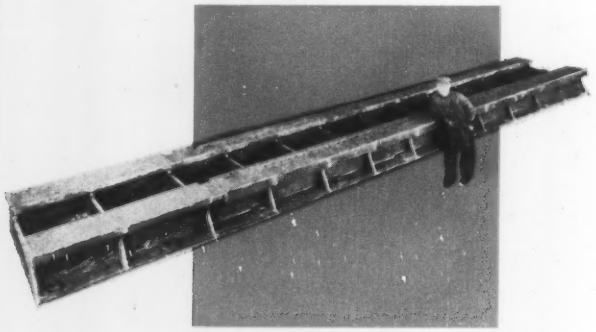
PENCO METAL PRODUCTS DIVISION
Steel cabinets, lockers & shelving

COREMAKING TIME . . .

Conventional	**136 hr**
Air-Setting	**26 hr**

Shakeout Time . . .

Conventional	**50 hr**
Air-Setting	**1 hr**



Air Setting Speeds Coremaking

MEMO TO MANAGEMENT

This process is a natural for jobbing foundries that make large and medium size castings. Special equipment is not needed. An oil binder which oxidizes with air is used to develop green strength in sand. A number of benefits result. Madison Foundry Co., Cleveland, saved 46 per cent on some material and labor costs in making a 4000-lb turntable. State Foundry, Akron, reported savings of 63 per cent on a lathe bed.

THE CASE HISTORIES above illustrate two advantages of the air-setting process: Time is saved in making cores and knocking them out. State Foundry Co., Akron, used the process in casting a 16-ton lathe bed (left). St. Marys Foundry Co., St. Marys, O., used it on a core for the head of a horizontal boring mill (right).

Other advantages: Fewer rods, especially those used to support the green core, are needed; baking times are reduced by one-third; a hard core with excellent collapsibility is produced; and dimensions are held accurately because the core is not removed until it has hardened in the corebox.

The sand used also works well for mold facing.

Chemistry of Process — Also known as the cold-set process, it uses an oil binder which develops green strength in the sand mixture when it oxidizes with air. Specifically, the oil film between the sand grains oxidizes.

The binder is viscous, has excellent storage life, is stable and nontoxic.

Powdered accelerators containing oxygen are added to the mixture to control the drying speed of the binder. Metallic drying agents are included to control the release of oxygen, which, in turn, governs the development of green strength.

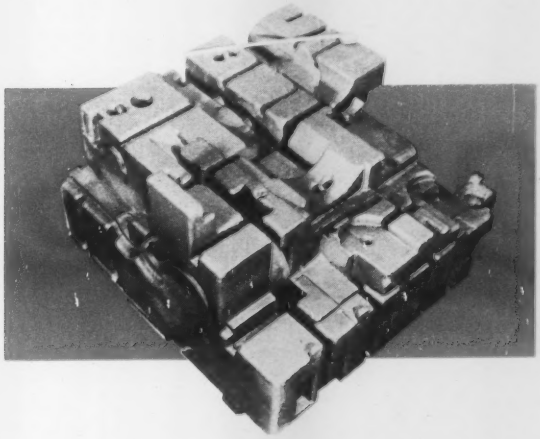
Conventional Sand Used — Any coremaking sand (other than crude containing more than 2 per cent clay) can be used. It must be as

COREMAKING TIME . . .

Conventional	**8 hr**
Air-Setting	**1¼-hr**

Shakeout Time . . .

Conventional	**8 hr**
Air-Setting	**¾-hr**



By DANIEL R. CHESTER
Manager, Technical Service
Archer-Daniels-Midland Co.
Cleveland

dry as possible—less than 0.25 per cent moisture.

If the sand has an AFS grain fineness number of 90 or less, 1.5 per cent of the binder (by weight) should be enough.

Large amounts of bank sand or additional fines, such as silica flour or iron oxide, slow the setup time of the sand mixture. This can be compensated for by increasing the amount of accelerator.

Mulling time depends upon the type, efficiency and speed of the mixer. Usual time is 1½ to 5 minutes.

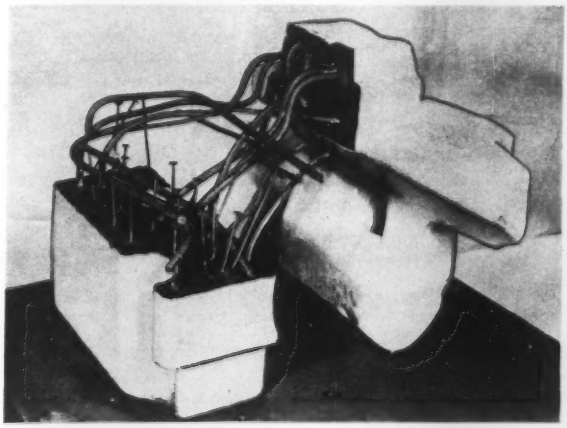
Heat Governs It—Because the process is one of oxidation, heat will speed it up. The sand mixture cannot be stored indefinitely.

Both sand temperatures and climatic conditions have a marked effect on working time—the elapsed time between discharge from the muller and when the sand mix begins to lose its free flowing properties and develops green strength.

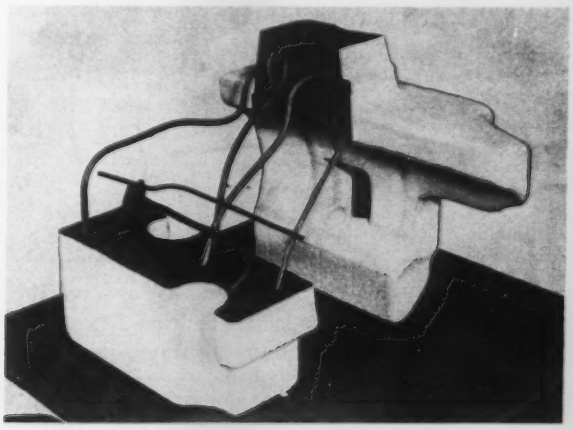
Cold sand and low discharge temperatures slow oxidation and the development of green strength; hot temperatures and hot sand cause a speed-up. Varying the amount of accelerator will compensate for sand and discharge temperatures.

If the sand is used after it has started to set up, a weak core (and trouble) will result: Burn in, penetration, crumbling edges.

Coremaking Procedures—Shoveling, using a dump box or any other convenient method can be used to fill the coreboxes. Ramming is not necessary because the sand mixture is free flowing, but



Extensive reinforcement required by conventional core sands is illustrated by sectioned core, left. Simplified rodding St. Marys Foundry Co., St. Marys, O., uses with the air-setting mix is pictured on right



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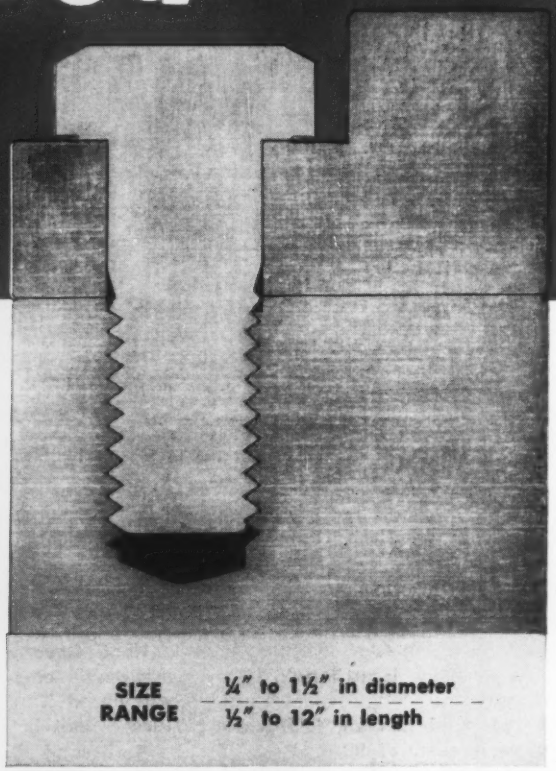
TO REDUCE FASTENING COSTS



LAMSON

1038 CAP SCREWS

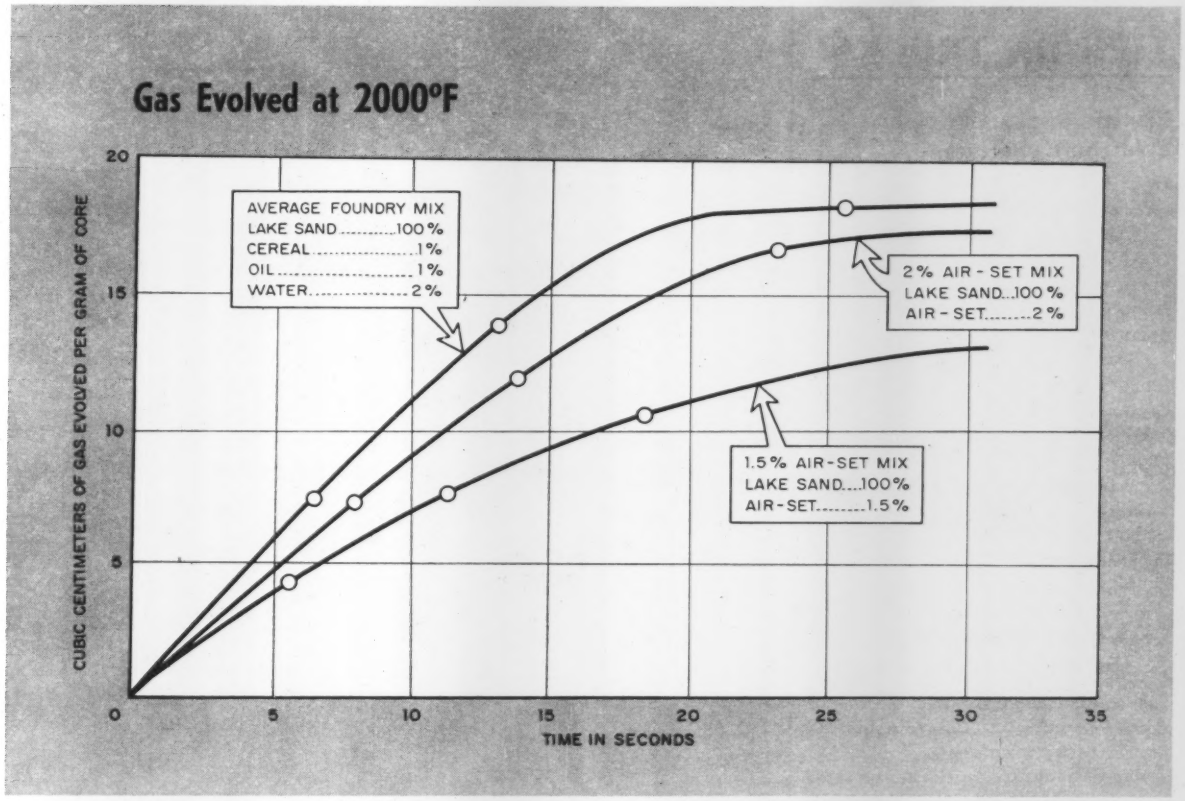
SIZE RANGE	¼" to 1½" in diameter ½" to 12" in length

8 WAYS TO SAVE MONEY BY USING LAMSON 1038 CAP SCREWS:

For any given strength requirement, LAMSON 1038 HIGH TENSILE CAP SCREWS can do the job with a MINIMUM:

1. **Initial fastener cost**
2. **Screw diameter**
3. **Screw length**
4. **Tapped hole diameter and depth**
5. **Drilled hole diameter**
6. **Handling expense**
7. **Assembly cost**
8. **Inventory expense**

Write for the special FREE bulletin on Cap Screw analysis



it is advisable to tuck the sand in any deep pockets in the box.

A denser core can be made by vibrating the outside of the corebox with a pneumatic rammer or a portable vibrator.

Fewer rods are needed—field tests indicate a reduction of one-third to one-half of the rods needed to make regular oil-sand or pitch cores.

Air-setting cores maintain dimensional stability during baking, but the core rods expand. Excessive rodding will sometimes crack the core. Vent wax placed at each end of the rod helps to reduce the expansion problem. When they do occur, cracks are seldom more than a hairline and can be pasted without harm to the core or casting.

Core Hardening—Nothing happens for a short time after the core is made; the top core surface is soft. Suddenly, the core starts to develop green strength, and the exposed surface rapidly becomes extremely hard.

Experience is the best guide on when to roll the corebox over for stripping. If the core is less than 18 in. high, 30 minutes after the core surface starts to harden is usually enough setup time.

When the height of the core is more than 18 in., 1 hour is usually required.

Parting—If coreboxes are clean and in good condition, parting will cause little or no difficulty.

If there are rough surfaces, oil or kerosene impregnated wood or deep draws with little or no draft, a dry parting will be needed.

Liquid partings are not recommended because most of them have an adverse effect due to their kerosene base.

Silicone partings with volatile solvents give excellent results. They are essentially dry parting because the solvent vehicle that carries the silicone evaporates almost immediately.

Using a portable vibrator will reduce wear and tear on the coreboxes and make stripping easier.

Short Cuts to Setting—Several methods can be used to speed the setting of the core in the box—particularly those of extreme depth. Warm or hot coke can be used instead of cold coke as a venting material. A steady, slow passage of dry air through the core will speed setup. Venting the core as much as possible with a wire will help.

Another way to reduce waiting time is to use a block of wood as a vent. It is removed after the core has started to set.

Core Wash, Baking—Conventional core washes can be used. Cores may be washed before or after baking. Thin spraying or brushing the core in the green state and again after baking works well.

Baking times are one-third less than those of regular oil-sand cores. The recommended range is 400 to 450°F.

Air setting cores can be baked at recommended temperatures along with oil-sand cores with little danger of overbaking. If oven temperatures exceed 450°F, an air-setting core will overbake and burn unless the baking cycle is reduced.

(Advertisement)

TIPS ON TRUCKS

Electric trucks give clean, quiet, safe operation

In critical warehousing operations, certainly, the arguments in favor of "going electric" are numerous. Even if you consider just a few—say cleanliness, quiet operation, and safety, the balance is way in favor of the battery-operated truck.

Clean? No worry about fumes, objectionable odors, oil drip, when you run electrics.

Quiet? You can hardly hear electrics glide by. Here's smooth, silent power . . . no noise problems for workers.

Safety? Consider the absence of carbon monoxide, minimum fire and explosion hazards.

Makes quite a case for electrics!

Look to the power source . . . the extra-capacity battery

Just as there is a big difference between types of trucks, so is there a big difference between batteries.

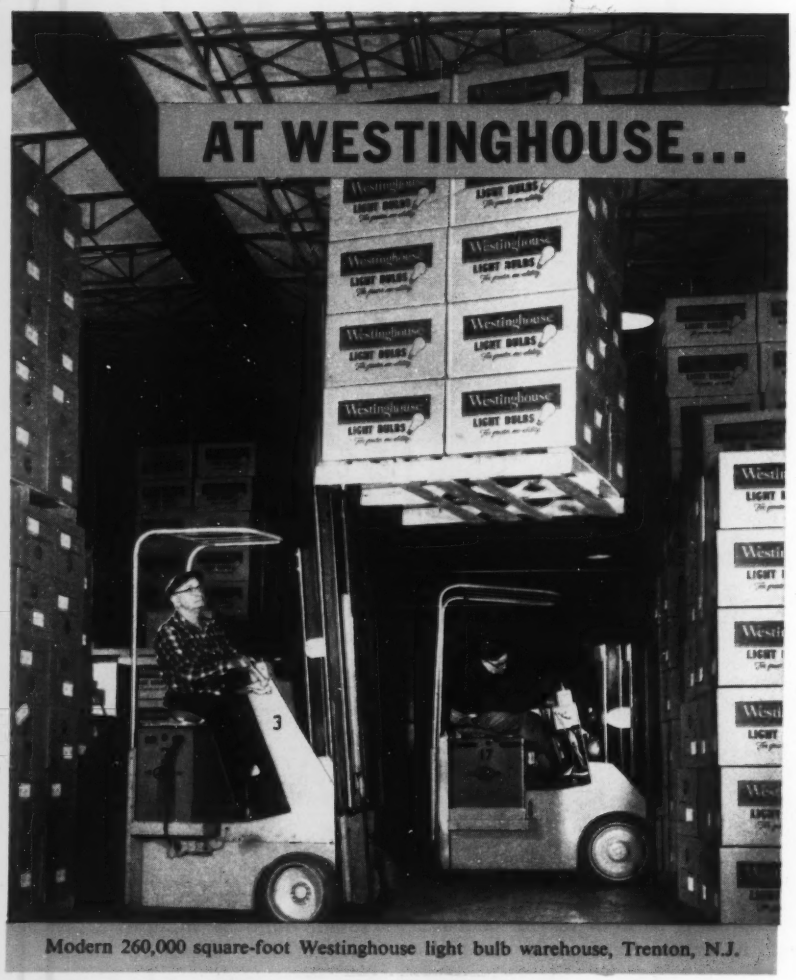
Wherever electric trucks are powered by modern, advanced-design C & D *Slyver-Clad* batteries, companies are able to get the most out of their trucks. Here is the best power package available today. Plates are longer, heavier, designed so as to eliminate "shedding"—thus prolonging battery life. In addition, all C & D *Slyver-Clad* batteries are now equipped with new Hi-Impac cell covers and containers. Truck downtime due to cell cover or container breakage is virtually eliminated.

(It will pay you to check on electric trucks powered by C & D batteries. Just send for the literature offered in advertisement at right.)

Match best with best

...the best in trucks—electric

...with the best in batteries—C & D



Modern 260,000 square-foot Westinghouse light bulb warehouse, Trenton, N.J.

Move a million bulbs a day; electric trucks silent, safe, sure

Trucks all electric . . . powered by C & D

"You can be *sure* . . . if it's Westinghouse." And you can be sure Westinghouse is geared for peak-efficiency operation in its modern Trenton, N.J., Lamp Division Shipping Centre—largest warehouse in the country for the storage of electric light bulbs.

Moving *in* and moving *out* a *million* light bulbs a day at this strategic distribution center calls for a large fleet of fork-lift trucks. Trucks are efficient, clean, quiet. They're all *battery-electric* . . . have been for the past 10 years. And powered by C & D *Slyver-Clad*® batteries, the trucks not only run a full shift without recharging—they often work 10 to 11 hours at a stretch—thanks to C & D's extra capacity.

Westinghouse, too, uses C & D !

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See how C & D's advanced principles of design and extra battery capacity cut material handling costs . . . give your trucks a power boost.

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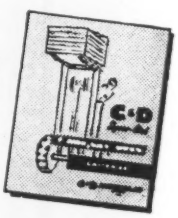


C&D BATTERIES, INC.

of Conshohocken, Pa.

SINCE 1906

Sales and service offices in principal cities from coast to coast

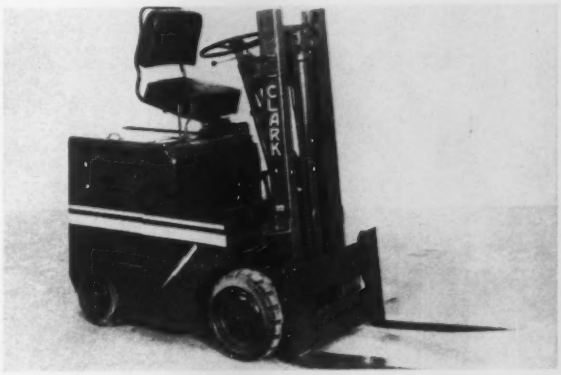
Battery Powered Fork Truck Lifts 1500 Lb

This truck has a lift speed of 43 ft a minute. It will climb a 10 per cent grade. A pivoted steering axle keeps the wheels on the ground to prevent loss of traction when traveling over bumpy surfaces.

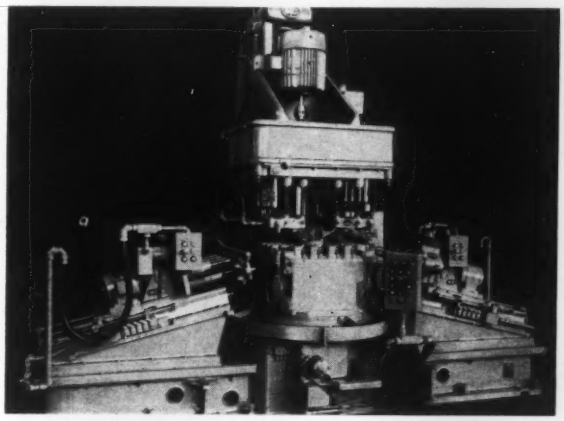
The 4000-lb truck has uniform acceleration. It will not jerk when the accelerator is depressed all the way.

Hydraulic pressure is maintained by a vane type pump operated by its own completely enclosed motor.

Double-acting tile cylinders give the operator complete control of the upright in all positions. A finger tip lever on the steering column controls forward and reverse direction and automatically puts the machine into first point of power. *Write*: Industrial Truck Division, Clark Equipment Co., Battle Creek, Mich. *Phone*: Woodward 2-6561



Drillers Complete 756 Valve Rocker Arms an Hour



The vertical head of this three-way machine contains 12 spindles. Its two angular heads have four spindles. A four-position automatic indexing table holds four parts at each position.

Two holes are drilled through in two steps and one of the holes is finish bottomed.

All parts are hydraulically clamped. A hydraulic distributor insures a constant clamping pressure at working stations even during loading and unloading.

Used in combination with the three-way machine is a vertical machine which has 16 spindles and a six-position automatic indexing fixture.

Four parts are clamped hydraulically at each position. The major hole in each part is core drilled, rough reamed and semifinish reamed. *Write*: National Automatic Tool Co. Inc., Richmond, Ind. *Phone*: 2-1183

Heaters Can Be Tailored to Specific Jobs

This electronic induction heater (15, 30 or 40 kw) can be provided with a built-in high frequency output transformer, stepless power control and a built-in heat exchanger and pump.

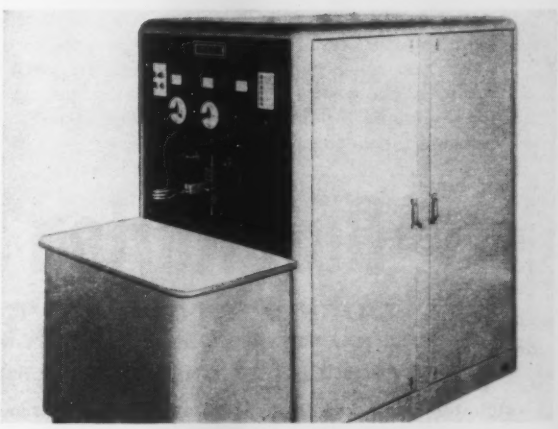
It uses a dustproof cabinet, constant voltage filament supply, ceramic water columns and electronic keying and power tap switches.

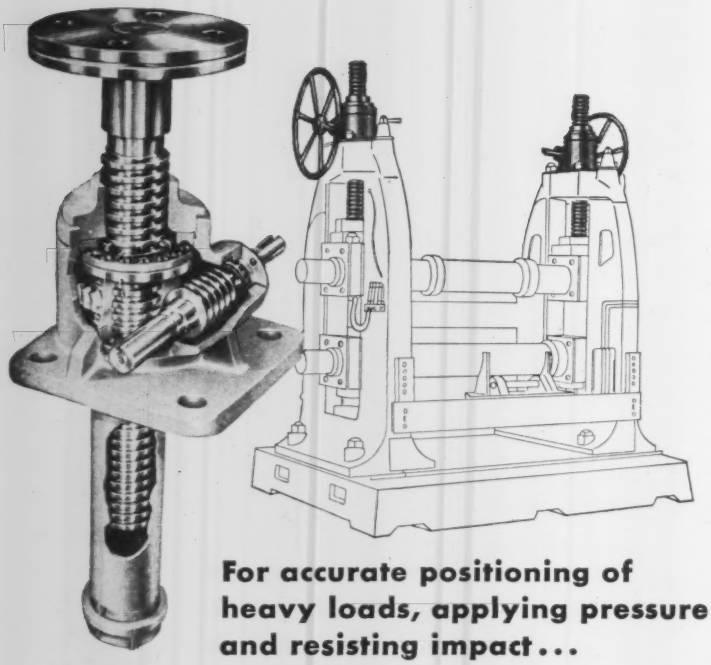
Instruments include a control check light system and plate current, plate voltage and grid current indicators.

Water flow and thermal switches, a filament time delay and overload relays increase operating safety.

The high oscillator tank rating permits use for a wide range of heating loads.

The equipment is available in frequencies ranging from 60 to 450,000 cycles. *Write*: Magnethermic Corp., Youngstown, O. *Phone*: Sterling 8-9661





For accurate positioning of heavy loads, applying pressure and resisting impact...

Duff-Norton Worm Gear Jacks

Duff-Norton worm gear jacks provide a purely mechanical means for accurately positioning loads weighing up to several hundred tons and maintaining them indefinitely without creep. They may be incorporated into the design of a new piece of equipment, or installed in existing facilities to replace other positioning devices. They will operate in any position, and functioning as components of machinery or equipment, worm gear jacks can raise or lower loads, apply pressure, or resist impact.

Capacities range from five to 50 tons. When two or more are connected by means of shafting and mitre gear boxes to raise loads they lift in unison—even when the load is unevenly distributed. Worm gear jacks are available with standard raises up to 25 inches, and will maintain an exact raise through years of service without adjustment. Each of the six sizes has a standard worm gear ratio ranging between $6\frac{3}{4}$:1 and 32:1. They are made with either square or Acme threads, and give one inch raise for from 10 to 48 turns of the worm. Jacks are suitable for operation at ambient temperatures as high as 200°F.

Thousands of worm gear jacks are in use on feed tables, tube mills, welding positioners, pipe cut-off and threading machines, loading tables, rolling mills, conveyor lines, arbor presses and numerous other types of equipment. To learn how they can improve the performance of your equipment and save you money, write for bulletin AD-34-BB or ask for a Duff-Norton representative to call.

Duff-Norton Jacks

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P. O. Box 1889 • Pittsburgh 30, Pennsylvania

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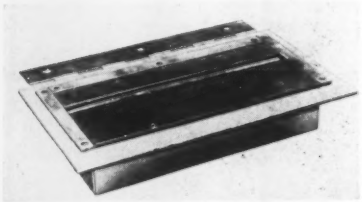
Ratchet Jacks, Screw Jacks, Hydraulic Jacks, Special Worm Gear Jacks, Ratchet Hoists, Electric Hoists, Load Binders, Spur Gear Hoists

NEW PRODUCTS and equipment

Plate Magnet

Magnetic force in this unit is concentrated directly over the first pole piece as a result of the offset air gap.

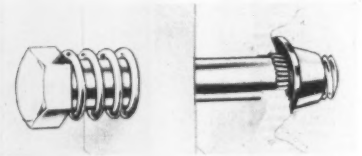
Tramp iron is removed by the magnet from flowing material in chutes, spouts, ducts or on conveyors. The material enters the magnetic zone and is held in the air gap.



Three sizes (according to strength of pull) come in widths from 6 to 48 in. *Write*: Stearns Magnetic Products, 635 S. 28th St., Milwaukee 46, Wis. *Phone*: Evergreen 3-4800

Self-Locking Nuts

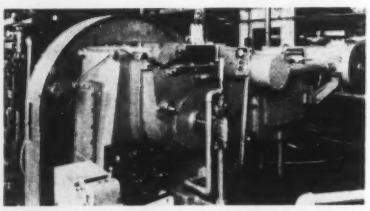
Flush installation in stock as thin as 0.03 in. is possible with these tiny clinch nuts.



The special nylon locking inserts will hold at temperatures up to 350°F. The metal nut can be used up to 550°F. *Write*: Elastic Stop Nut Corp. of America, Union, N.J. *Phone*: Murdock 6-6000

Gas Liquefaction

The expander engine used for gas liquefaction generates shaft horsepower as a useful by-product. An air flow of 250 lb a minute at



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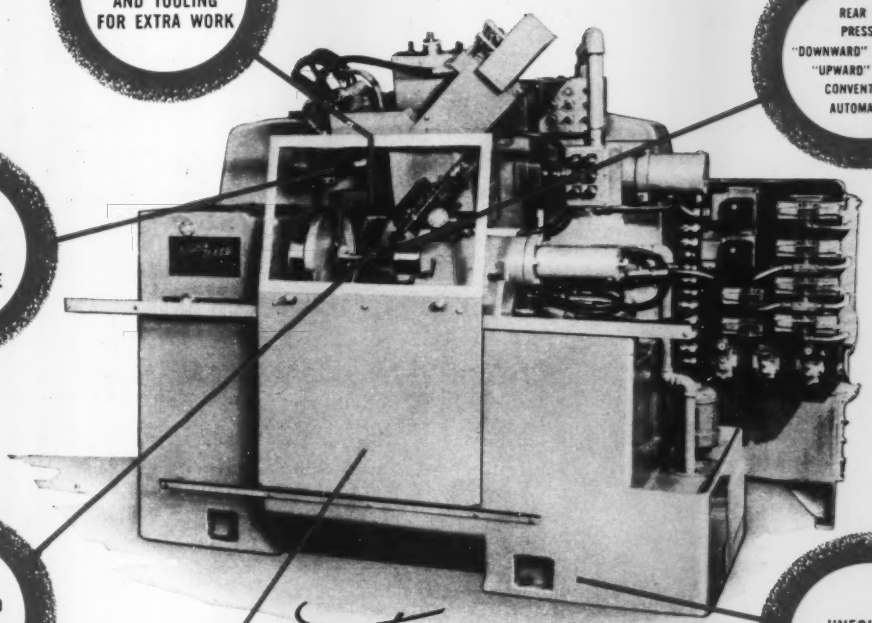

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AVAILABLE IN FOUR SIZES

two models

Ruggedness, versatility and high production are outstanding advantages of the Bullard Hydra-Feed Lathes. Sizable reductions in finished piece cost are obtained with single setup machining of a broad range of complex shapes.

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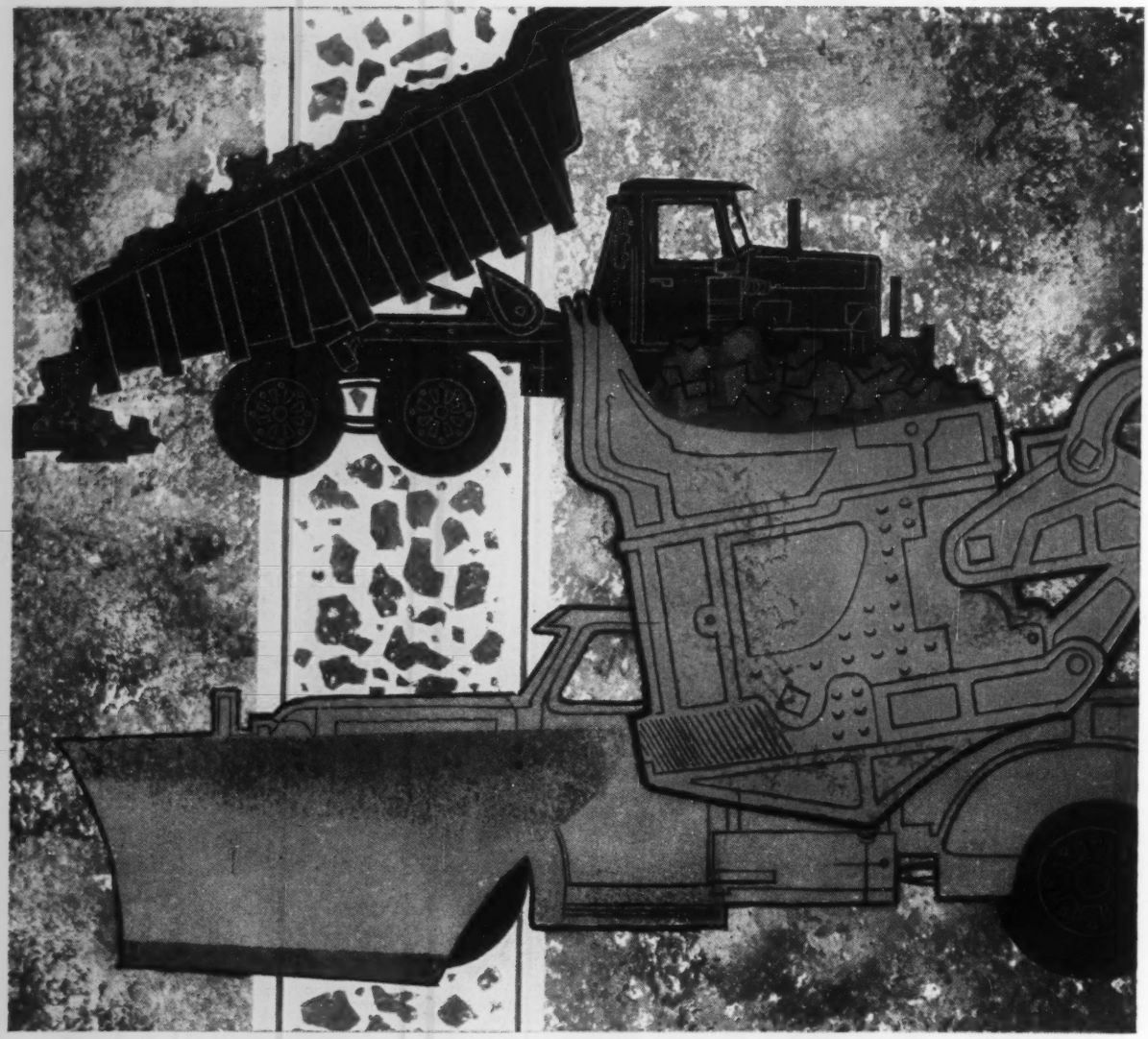


JALLOY special alloy steel

resists impact and abrasion in toughest applications

Heat treated Jalloy steels wear as much as 20 times longer than mild steels under rigorous impact and abrasive conditions. By using Jalloy you can cut maintenance costs drastically. Increased product life reduces downtime and lowers your labor costs.

Jalloy steels are available in the forms you require (plates, hot rolled sheets, hot rolled bars, small shapes and structurals). Jalloy can be purchased in three grades to meet specific use requirements: Grade 1, where formability is important; Grade 3, capable of being heat treated to excellent physical properties for good resistance to abrasion or wear; Grade 7, where high hardness with good ductility or wear resistance is desirable.

Your local distributor can supply you with latest information on these Jalloy grades, or you can write to Jones & Laughlin Steel Corporation, Dept. 404, 3 Gateway Center, Pittsburgh 30, Pa.

STEEL

Jones & Laughlin
... a great name in steel

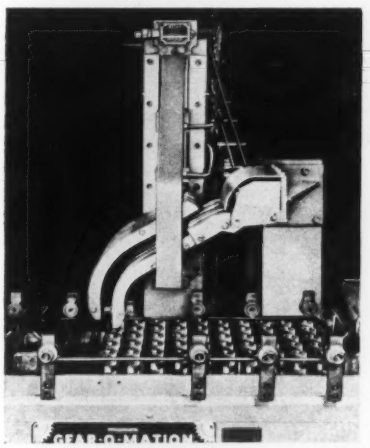
an inlet pressure of 3000 psi develops over 200 hp.

The engine can be coupled directly to a compressor drive shaft, an electrical generator or a brake. It can handle temperatures as low as −300°F. *Write*: Cooper-Bessemer Corp., Mt. Vernon, O. *Phone*: Ex 3-0121

Machine Loads Parts

Up to 2500 pinions (2½-in. long) are basket loaded by this machine in an hour. The unit can be modified to load pinions up to 4 in. or more in length.

Parts are fed to a dropping mechanism through an enclosed track using chain lifts and gravity flow. As they leave the incoming track, they are gravity fed onto upright basket prongs.



The release is controlled by tilting the curved tracks so that the parts will slide.

Empty baskets enter the loader on a chain conveyor. As each row of prongs in the basket is loaded, the next row is automatically indexed into place. *Write*: Gear-O-Mation Division, Michigan Tool Co., 7173 E. McNichols Road, Detroit 12, Mich. *Phone*: Twinbrook 1-311

Scrap Baling Press

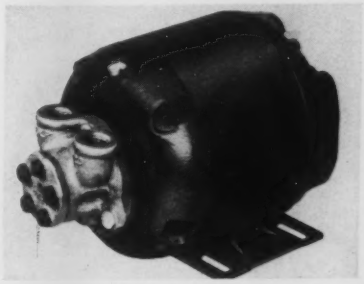
An entire automobile body (without frame) can be compressed into a high density bale by this scrap baling press.

It has a precharge box 5 ft deep, 6 ft wide and 12 ft long. *Write*: Superior Machine Co., 1389 Heistan Place, Memphis 4, Tenn. *Phone*: Broadway 6-7176

Pump-Motor Units

These positive displacement pump and driving motor units are used for hydraulic, oil burning and lubricating services. They are close coupled. The pump is mounted on the motor.

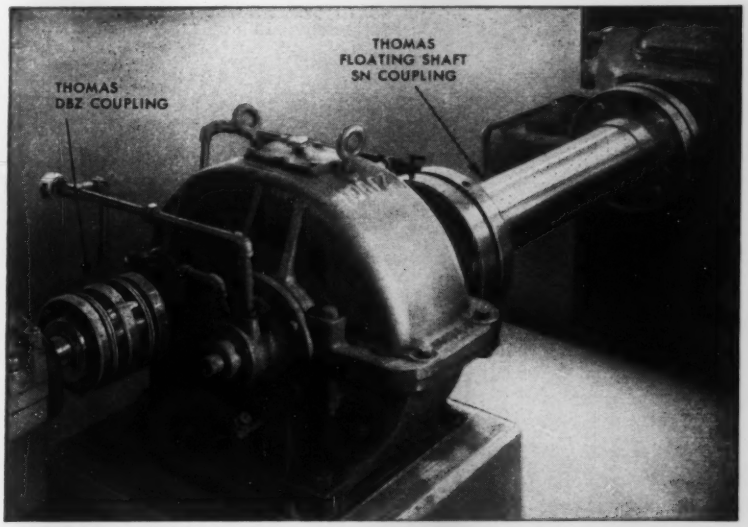
Their flow capacity ranges from 20 to 300 gallons an hour with pressures up to 1500 psi. *Write*:



Tuthill Pump Co., 939 E. 95th St., Chicago 19, Ill. *Phone*: Regent 4-7420

THOMAS FLEXIBLE COUPLINGS

Give You Freedom From Coupling Maintenance



NO LUBRICATION **NO MAINTENANCE** **NO WEARING PARTS**

Future maintenance costs and shutdowns are eliminated when you install Thomas Flexible Couplings. These all-metal couplings are open for inspection while running.

They will protect your equipment and extend the life of your machines.

Properly installed and operated within rated conditions, Thomas Couplings should last a lifetime.

Under Load and Misalignment only Thomas Flexible Couplings offer all these advantages:

1 Freedom from Backlash Torsional Rigidity
2 Free End Float
3 Smooth Continuous Drive with Constant Rotational Velocity
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5 Original Balance for Life
6 No Lubrication
7 No Wearing Parts
8 No Maintenance

Write for Engineering Catalog 51A

THOMAS

THOMAS FLEXIBLE COUPLING COMPANY
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2. **NO "STARTING"** Problems . . . regardless of cold, heat, rain, dust.
3. **NO "HOUSING"** Problems . . . no protective warehousing needed, no covering, no "babying".
4. **NO MAINTENANCE** Problems . . . nothing to get out of order . . . rugged, long-lasting.
5. **EASIEST WHEELING** . . . with choice of pneumatic, semi-pneumatic or steel-tired wheels (with plain, ball or roller bearings.) These are the easiest rolling wheelbarrows made!
6. **EASIEST** on the barrow man . . . engineered to balance 4/5th of load on the wheel; only 1/5th of load at handle grips.
7. **EASIEST CLEANEST-DUMPING** . . . steel trays engineered to unload completely, with least effort.

Costs Less per Year

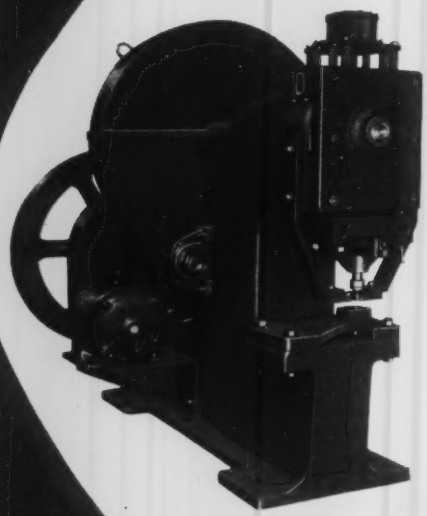
STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Look for this Mark of STERLING Quality

Sterling WHEELBARROWS

A 8245-3/5

it's the handiest punch in the fabricating shop



This 100-ton punch with architectural jaw is the "catch-all" machine for miscellaneous detail punching in many of the country's leading bridge shops. The usual quality features of Thomas construction are built into this machine:

- *Rugged construction*
- *Air counter balance of the cast steel ram*
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58

NEW literature

Write directly to the company for a copy

Wire Cloth

Types of industrial wire cloth available are described in this 94-page catalog. It shows typical applications and includes useful metallurgical tables. Cambridge Wire Cloth Co., Cambridge, Md.

Industrial Hose

This 4-page bulletin, IEB 26A, gives dimensional data and assembly instruction for an industrial hose. Aeroquip Corp., Jackson, Mich.

Radiant Heating Equipment

Eighteen typical applications of radiant heating equipment in metal processing are given in this 8-page bulletin, 57-108. Fostoria Pressed Steel Corp., Fostoria, O.

Check Valves

This 4-page bulletin describes the uses of check valves in aircraft, missiles and general service. James. Pond & Clark Inc., 2181 E. Foothill Blvd., Pasadena 8, Calif.

Portable Bar Racks

Storage racks for materials such as pipe, bar stock and sheet metal are described in this 4-page bulletin. Jarke Mfg. Co., 5407 N. Broadway. Chicago 40, Ill.

Closed Circuit TV

Applications of closed circuit television in industry are described in this 12-page bulletin, GEA 6382A. General Electric Co., Electronics Park, Syracuse, N.Y.

Titanium

Production information on machining, forming and welding titanium is given in this 24-page bulletin. It also includes the physical, mechanical and corrosion properties of titanium. Mallory-Sharon Titanium Corp., Niles, O.

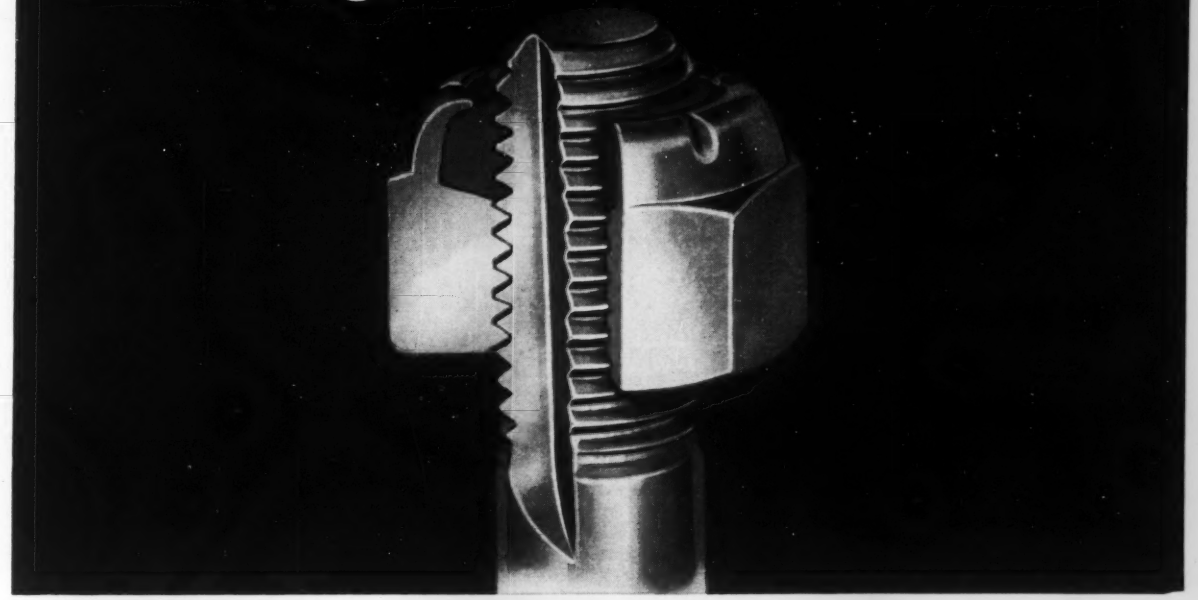
Grinding Wheels

Wheel types and uses, wheel markings and grinding faults are among the items explained in this 36-page catalog. Cincinnati Milling Products Division, Cincinnati Milling & Grinding Machines Inc., Cincinnati 9, O.

Motor Starters and Contactors

Magnetic arc centering is discussed in this 12-page bulletin, 14B8615. It describes motor starters and contactors ranging from 50 to 400 hp. Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

The nylon collared Elastic Stop® nut never damages bolt threads!



The nylon locking insert * will not seize threads, gall or remove plating

The red nylon locking collar is an integral part of an Elastic Stop nut. Undersize in diameter in relation to standard bolt tolerances, this insert grips the entering bolt threads with strong, smooth nylon fingers that dampen impact loads and resist turning under the most severe conditions of vibration or shock. The perfect fit between bolt threads and the locking collar also serves to seal off internal bolt and nut threads and to protect them against corrosion. Furthermore the nylon insert is impervious to gasolines, oils, salt atmospheres, cleaning compounds and common acids. The remarkable wear resistance of nylon plus its elastic recovery makes Elastic Stop nuts reusable through more than a hundred on and off cycles.

Because an Elastic Stop nut is a one-piece unit it is less expensive to install than castellated nuts and cotter pins, or double nuts. Equally important, it is a *stop* nut that *locks at any position on the bolt* without requiring secondary "safety" devices; it is simple to adjust precisely—it is easily wrenched off or readjusted. Elastic Stop nuts have been used by American industry since 1930 to solve the toughest applications on railroad, automotive, earth moving and farm equipment, as well as on all types of electrical machinery.

Elastic Stop nuts are available in sizes ranging from a watchmaker's 0-80 through 3″, and in many standard finishes and materials including carbon and stainless steels, brass, duronze and aluminum.

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also maker of the ROLLPIN TRADEMARK

*The Red Locking Collar is a Registered Trademark of ESNA

Elastic Stop Nut Corporation of America
Dept. N27-775, 2330 Vauxhall Road, Union, N. J.

Please send me the following free fastening information:

☐ ELASTIC STOP nut bulletin

☐ Here is a drawing of our product. What self-locking fastener would you suggest?

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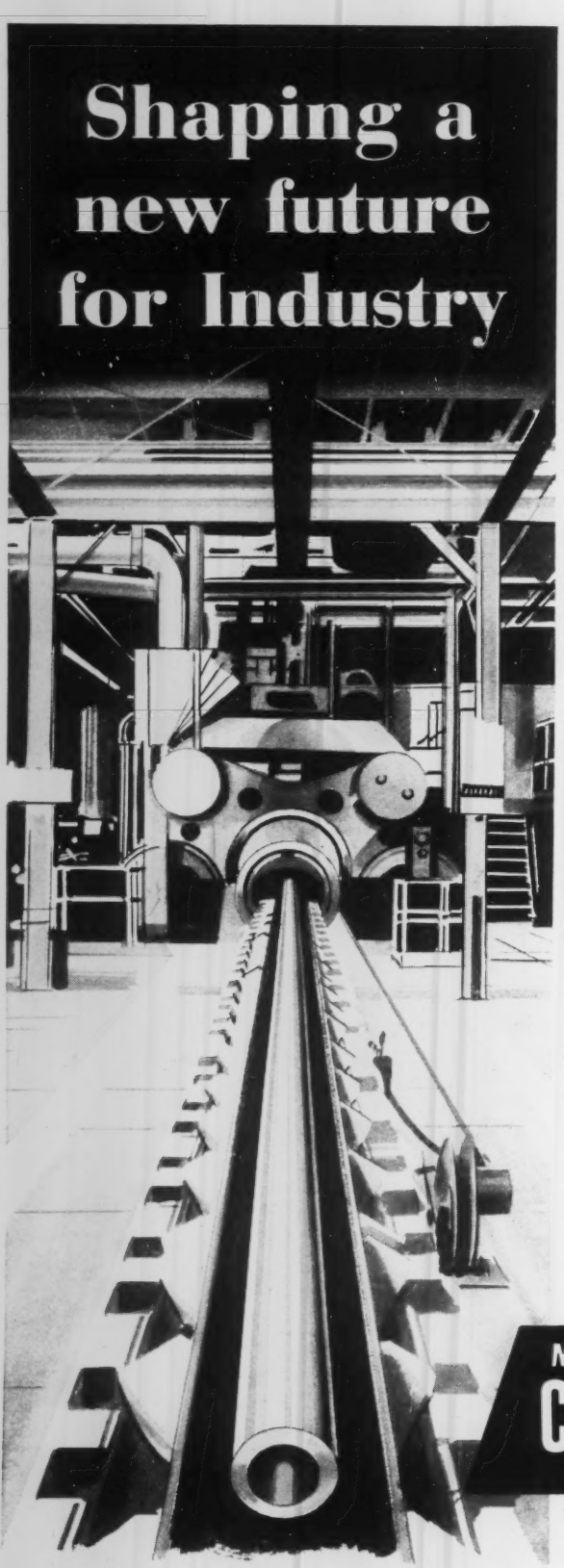
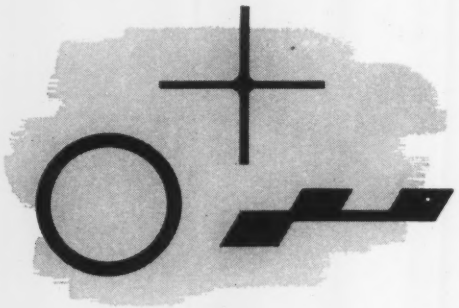
Shaping a new future for Industry





CURTISS-WRIGHT extrudes steels in shapes, lengths and sizes never before possible

Curtiss-Wright's Metals Processing Division is pushing steels into new uses for all industries. Shapes and sizes never before possible are being extruded in constantly increasing tonnages from alloy steels, stainless, titanium and other metals.

Starting with billets weighing up to 9000 pounds, the world's largest horizontal steel extrusion press moves the metal into shapes of virtually any profile that can be circumscribed by a 20-inch circle. Or, in a matter of seconds, the raw material may become heavy wall tubing up to 22 inches in diameter.

The 12,000 ton extrusion press and the complete facilities of Curtiss-Wright's Metals Processing Division are ready to go to work for you . . . to advance the design and production of metal products beyond the limitations of conventional equipment. Qualified engineering consultation available at all branch offices.

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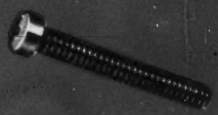
KEYSTONE XL WIRE STUDY

Wider diameters with less cracking on specials

Up to 4 times the die life on production runs



Eliminate one shaving operation

Consistent quality products

...for *UNIVERSAL* SCREW COMPANY using KEYSTONE XL WIRE

flowability IS THE SECRET

Here are a few products cold headed by Universal Screw Company, Evanston, Ill. This firm has used Keystone Heading Wire since 1950. Their president, Arnold Meyer, says, "We prefer Keystone for their flexibility, prompt attention, freedom from complaints on their wire and willingness to work with us. We have found Keystone Wire gives less grief, and we've been able to produce many difficult parts because of the exceptional *flowability* of Keystone Heading Wire. Keystone's delivery schedules are strictly adhered to. We have cut our inventory substantially because of Keystone's excellent service."

See your Keystone representative for complete details — or, for the name of Keystone Wire users who can help you, call us.

Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE
WIRE FOR INDUSTRY

View of a few of the modern thread rolling machines at the Universal Screw Company, Evanston, Illinois.

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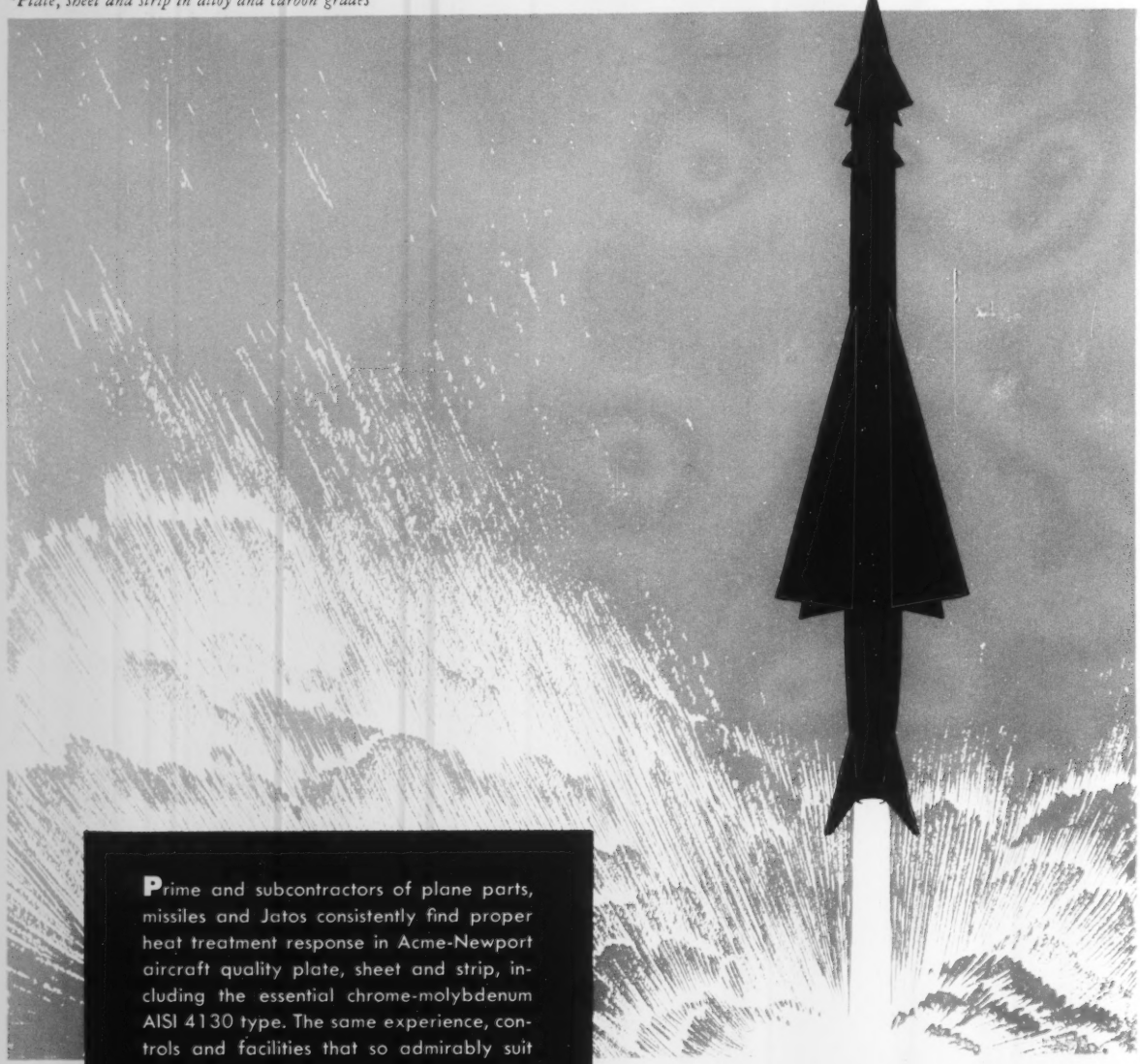
AIRCRAFT QUALITY STEELS* from

Acme-Newport

**Plate, sheet and strip in alloy and carbon grades*



Prime and subcontractors of plane parts, missiles and Jatos consistently find proper heat treatment response in Acme-Newport aircraft quality plate, sheet and strip, including the essential chrome-molybdenum AISI 4130 type. The same experience, controls and facilities that so admirably suit these alloy and carbon steels to the vital needs of national defense, also match the requirements of general industry. Steel users know that whatever the specification, Acme-Newport products always are high quality, uniform and dependable for their intended use.

Acme-Newport Steel COMPANY
NEWPORT, KENTUCKY
A SUBSIDIARY OF ACME STEEL COMPANY

Market Outlook

STEEL DEMAND is looking up.

July is turning out to be a little better month saleswise than some people had expected, and orders for August delivery are shaping up for even a better month than July.

The improvement comes not from any one industry but from a wide group of consumers.

BENEFICIARIES— Sharing in the upturn are widely used products like hot-rolled and cold-rolled carbon steel sheets and hot-rolled and cold-finished carbon bars.

Warehouses—suppliers of small quantities of steel to thousands of users—are also noticing a sales improvement.

These upturns have come even though many consuming plants are taking a week or two out for vacations. Some sellers say business is just as good this month as it was in June.

BETTER YET—September is expected to be even better than August for steel producers. By then, demand for steel for the 1958 models of automobiles should be making itself felt. One steel producer that depends heavily on the automobile industry for business reports a definite pickup in automotive orders for August delivery.

STRIP PLATES TIGHTEN— Demand for heavy plates is not as strong as it was early this year, but it still exceeds the supply and is expected to do so through the fourth quarter. Strip mill plates are not quite as easily procured as they were a few weeks ago. This tightening is ascribed to mills' expectations of an increased demand for sheets. The mills don't want to crowd out sheet tonnage.

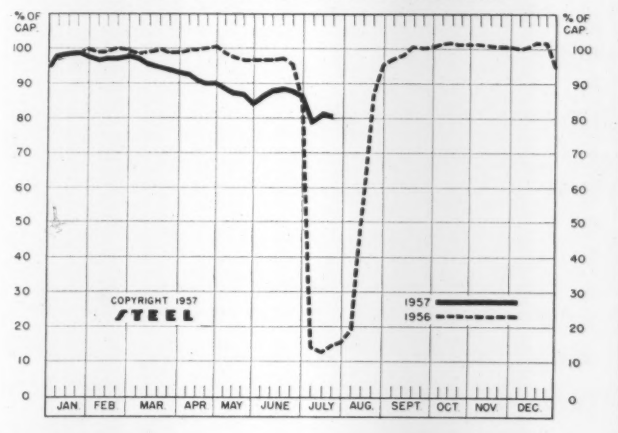
Structural steel demand has been easing, and the need for structurals is being shrunk temporarily by a strike in the cement industry. Lacking cement, contractors can't go ahead with projects that also use structurals. The cement strike is hurting another form of steel that goes into construction work. The victim: Reinforcing bars (which are used to strengthen concrete).

PRODUCTION RISES— Despite these conditions, steel demand was good enough to push up production in the week ended July 21 a half a point over that of the preceding week. Output in the week ended July 21 averaged 81 per cent of capacity. This is far above the rate (14.5 per cent) of the corresponding week a year ago, when the steelworkers were on strike.

PIG IRON PRICES UP—Prices continue to be adjusted upward. Warehouses are marking up theirs to pass on increases from the mills. Pig iron is going up, too. Following a move by southern producers, northern companies are raising prices—although not so much. The southern producers, who did not raise pig iron prices $2 a ton last March when northern producers did, have upped their prices by $3.50 a gross ton. Northern producers are marking up their prices $1.50 a ton. This restores the $4 differential that prevailed early this year between northern and southern iron, the differential being added to the northern iron.

SCRAP DECLINES— Scrap prices continue to edge downward. In the week ended July 17, STEEL's price composite on steelmaking grades was $54.33 a gross ton, an 84 cent decline.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended July 21	Change	Same Week 1956	Same Week 1955
Pittsburgh	85.5	— 2*	2.5	97
Chicago	84	— 1.5*	6	96.5
Mid-Atlantic	90	— 3	11	95
Youngstown	79	+ 6	5	98
Wheeling	77	— 3	53.5	92.5
Cleveland	77.5	— 1.5*	0	98
Buffalo	88	0	0	105
Birmingham	91.5	— 1	3.5	93.5
New England	50	+30	38	83
Cincinnati	63.5	0*	69.5	84
St. Louis	84.5	+ 4	84	88
Detroit	86.5	+ 0.5*	43.5	87.5
Western	99	— 2	30	99
National Rate	81	+ 0.5	14.5	93.5

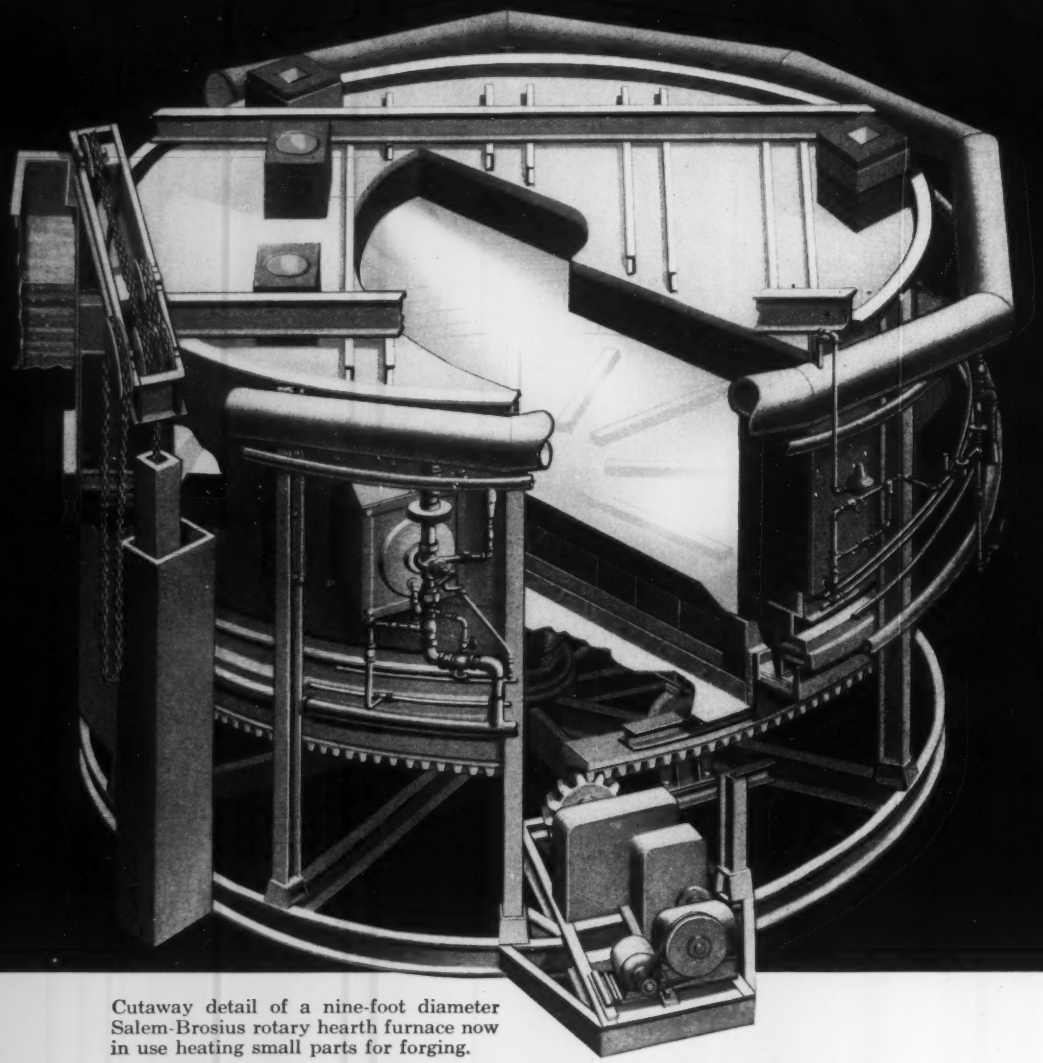
INGOT PRODUCTION‡

	Week Ended July 21	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	129.0†	125.4	135.8	23.5
NET TONS (In thousands)	2,073†	2,015	2,181	377

*Change from preceding week's revised rate.
†Estimated. ‡Amer. Iron & Steel Institute.
Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—p. 57

Technical Outlook—p. 99



Cutaway detail of a nine-foot diameter Salem-Brosius rotary hearth furnace now in use heating small parts for forging.

This Salem-Brosius rotary furnace in your forge shop saves you money

Companies producing parts for aircraft, automobiles, farm machinery, home appliances and a host of other products find the most economical and efficient furnace they can use to heat parts for production forging is the rotary type shown here. Burners are tangentially placed, and the heat is accurately controlled and uniformly distributed throughout the furnace chamber. The speed of rotation may be varied and is precisely set to the need of the product.

There is no practical forge heating method known that can equal the high production, low maintenance, low fuel cost, and uniformity of product heating of these specially designed rotary hearths. Salem-Brosius has designed and built more rotary hearth furnaces than any other company in the world. Write to us for further information.

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WHO'S WHO IN VACUUM MELTED ALLOYS

COMPANY	VACUUM INDUCTION PROCESS Place	Annual Cap. (lb)	VACUUM ARC PROCESS Consumable electrode Place	Annual Cap. (lb)
Allegheny Ludlum Steel Corp.	Watervliet, N. Y.	3,000,000	Watervliet, N. Y.	24,000,000
Allvac Metals Co.	Monroe, N. C.	500,000[9]		
Cannon-Muskegon Corp.	Muskegon, Mich.	450,000		
Carpenter Steel Co.	Reading, Pa.	600,000	Reading, Pa.	8,000,000[1]
Crucible Steel Co. of America	Syracuse, N. Y.	1,920,000[2]		
Wilbur B. Driver Co.	Newark, N. J.	4,000,000		
Firth Sterling Inc.	Minerva, O.	2,400,000[3]	Trafford, Pa.	1,200,000[4]
Metallurgical Products Dept., General Electric Co.	Detroit	1,000,000		
Haynes Stellite Co., Division of Union Carbide Corp.	Kokomo, Ind.	3,600,000[5]		
Latrobe Steel Co.			Latrobe, Pa.	500,000[13]
Mallory-Sharon Titanium Corp.			Niles, O.	(14)
Midvale-Heppenstall Co.			Philadelphia	16,000,000
Oregon Metallurgical Corp.			Albany, Oreg.	1,200,000
Republic Steel Corp.			Canton, O.	(10)
Timken Roller Bearing Co.			Canton, O.	1,200,000[6]
Universal-Cyclops Steel Corp.	Bridgeville, Pa.	1,000,000[7]	Bridgeville, Pa.	12,000,000[8]
Utica Drop Forge & Tool Division, Kelsey-Hayes Co.	Utica, N. Y.	2,000,000[11]		
Vaculloy Inc.			Wooster, O.	600,000
Vanadium-Alloys Steel Co.	Latrobe, Pa.	Not available	Latrobe, Pa.	Not available[9]
Westinghouse Electric Corp.	Blairsville, Pa.	1,250,000	Blairsville, Pa.	3,000,000[12]

(1) Will begin operating in mid-1958.
(2) Will rise to 3,840,000 lb by end of 1957.
(3) An increase of 4,800,000 lb is planned.
(4) An increase of 2,400,000 lb is planned.
(5) Another 1,200,000 lb of vacuum induction or consumable electrode capacity will be added in first quarter of 1958.
(6) Planned for 1958.
(7) An increase of 1,500,000 lb is planned.
(8) An increase of 8,000,000 lb is planned.
(9) Capacity under construction.
(10) Company will use its titanium furnaces to make vacuum melted alloys. Capacity would range from 14,000,000 to 30,000,000 lb a year, depending on how much is used for the alloys and how much for titanium.
(11) This will be increased by 200 to 300 per cent in 1958.
(12) Capacity for single melting. Capacity for double melting is 1,500,000 lb.
(13) Will be increased 400 to 500 per cent by end of 1957.
(14) Company will use titanium and zirconium furnaces to make vacuum melted alloys on a limited basis.

Vacuum Melted Alloys Grow

They're relatively new on the market, but optimistic producers are boosting their capacities sharply. Many new uses are expected to stem from better availability

VACUUM melted alloys are no longer laboratory metals. They're being produced in commercial quantities, and the capacity to make them is being expanded rapidly and substantially. (The accompanying table shows this.)

What They Are — Vacuum melted alloys are in many cases well known ones, but in all cases they have new and improved characteristics.

As the word "alloy" implies, they are a mixture. They may be composed primarily of nonferrous metals, or they may be predominantly steel. There are many combinations.

Some are sometimes called superalloys. Examples are M-308, M-252, Waspaloy (nickel-base materials) and A-286 (iron-base). Other vacuum melted alloys include bearing steels, high-strength steels, electronic steels and low alloy steels, such as SAE-4340. Some bear registered tradenames, like Ferrovac-E and Nivac-P.

Why They're Good—They get their quality partly because of their cleanness, which is acquired in two ways: 1. Impurities are prevented from entering during the melting process. 2. Gaseous impurities already in the metal are sucked out by the vacuum while the metal is molten.

Other virtues include improved tensile and impact strength, increased stress rupture strength at elevated temperatures, lengthened fatigue life, uniformity and special electrical and magnetic characteristics.

What They're Used For—The aircraft industry has been the biggest user. It uses the alloys for jet engine parts like turbine wheels, turbine wheel spacers, turbine shafts, turbine cases and turbine blades, landing gear parts for jet planes, bearings and valve springs.

Among other uses are steam turbine parts, atomic energy and nuclear propulsion applications and electronic equipment.

Vacuum melted alloys are so new that many applications have

Why only ORE BRIDGES at McLouth's Trenton Mill?

At some steel plants the unloading, stocking and reclaiming of blast furnace materials are divided into separate operations. Two different machines, unloaders and bridges, work together economically to handle large tonnages.

This is not always the case. A plant that has only a few furnaces can realize substantial savings by building a dual-purpose machine to do the entire task. That's what McLouth did. At their Trenton, Michigan, mill these two modern Dravo bridges perform all functions —unloading, stocking and reclaiming ore and limestone.

Practical engineering assistance is available to help you solve problems or reduce costs in bulk materials handling or in any of the fields listed below. Write DRAVO CORPORATION, PITTSBURGH 25, PENNSYLVANIA.

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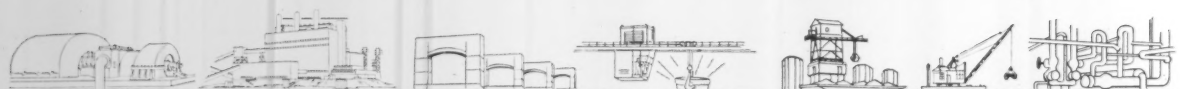


Blast furnace blowers • boiler & power plants • bridge sub-structures • cab conditioners • docks & unloaders • dredging • fabricated piping

foundations • gantry & floating cranes • gas & oil pumping stations • locks and dams • ore & coal bridges • process equipment • pumphouses & intakes

river sand and gravel • sintering plants • slopes, shafts, tunnels • space heaters • steel grating • towboats, barges, river transportation

not been explored. New avenues of usage are being opened by the increase in size of ingots that can be produced. You can get them as large as 26 in. in diameter and weighing up to 12,000 lb. (Allegheny Ludlum Steel Corp. makes these big ones at its Watervliet, N.Y., plant. Until now, its biggest ingots were 20 in. in diameter and weighed about 5000 lb.)

What They Cost — Vacuum melted alloys are priced in the same manner as the common forms of steel. They have a base price and extras. Extras in some cases are those used on stainless steels; in other cases, tool steel extras are used.

There's a wide variance in prices. Take the iron-base A-286. One producer quoted these base prices for vacuum melted material: $2.09 a pound for bars; $2.005 a pound for hot-rolled coils and cold-finished wire 0.5 in. in diameter and under; $3.0775 a pound for plates, sheets and strip; $2.185 a pound for forgings; and $1.975 a pound for forging billets. The price of some forms of A-286 was reduced 18 cents a pound last May as a result of the growing volume of production and increased know-how.

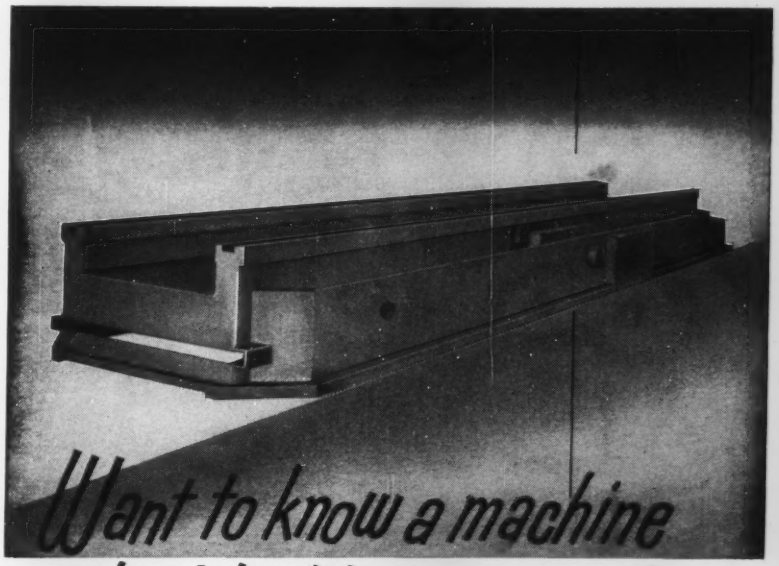
The same producer quoted base prices of $7.775 a pound on nickel-base M-252 bars and hot-rolled coils and cold-finished wire 0.5 in. in diameter and under; $8.355 a pound on forgings; and $7.23 a pound on forging billets. The producer quoted nickel-base Waspaloy at $7.775 a pound for bars and hot-rolled coils and cold-finished wire 0.5 in. and under; $8.355 a pound for forgings; and $7.23 a pound for forging billets.

Some of the low alloy and bearing steels are priced around $1.30 to $1.45 per pound, plus stainless or tool steel extras.

One producer's prices on vacuum melted A-286 are 36.5 cents per pound above its prices of air melted A-286.

How They're Shipped—Most of these alloys are shipped in mill form, with most of the tonnage in forging billets. Most of the shipments go to forgers in the East and Midwest.

Prospects—While the business has been tied closely to aircraft engine production—a field that



Right now there's a famous-name milling machine on this 32-foot Acme base, but our customer isn't telling how Acme redesign made his machine stronger and lighter, cut his machining time and trouble to the bone, and saved him money! Naturally he's talking about results: higher production, faster delivery, easy incorporation of special design features.

Your machine, too, can be redesigned as a weldment to include the same cost reduction advantages . . . and produce the same results. Interested? Then have one of our engineers call . . . it won't cost you anything. Fact is, our redesign and quotation service is *free*, and prompt, whether you are now using weldments or castings.

Write to Acme Welding, 1030 New Britain Ave., West Hartford, Conn. and ask for your free copy.

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UDYLITE MACHINE
processes washer-dryers
at WHIRLPOOL for perfect
porcelain
This Udylite Full Automatic operating in a plant of the Whirlpool Corporation helps give perfect porcelain finishes to the Whirlpool Washer-Dryers. It processes the parts through a 17 station cleaning and pickling cycle prior to porcelain coating. Since June 1, 1956, this Udylite machine has operated constantly 16 to 24 hours per day.
Nowhere is the fine porcelain finish more dependent on precision than in this cleaning, pickling, and nickel immersion cycle of the Udylite engineered machine. Every step of the cycle is so precisely timed that each part gets the same exact treatment prescribed by Whirlpool engineers.
Add Udylite experience to your knowledge for the right answer to your metal processing problems. Write us today.
THE Udylite CORPORATION
DETROIT 11, MICHIGAN
WORLD'S LARGEST PLATING SUPPLIER

may shrink with the shift in emphasis from aircraft to missiles—the makers of vacuum melted alloys are undaunted. They look to the gas and steam turbine for power plants and automobiles as potential markets. As William B. Pierce, vice president-sales, Allegheny Ludlum Steel Corp., Pittsburgh, says, a lot of other applications will come from increased capacity. Until now, many designers have been reluctant to design for these materials until they were sure of sufficient supply. Mr. Pierce was instrumental in building up his company's vacuum melting capacity to the largest in the industry.

Growing Capacity—Until a few years ago, much of the production was in the laboratory. Now, producers are anticipating industry's needs and are building ahead of them. (For details of capacities, see the table on page 137.)

Three principal methods of production are used: 1. Induction. 2. Consumable electrode remelting. 3. Vacuum degassing of ingots.

Induction is the oldest commercial process. Most of the bets, though, are being placed on a newer process—consumable electrode remelting. Its capacity is three times that of induction vacuum melting.

Vacuum degassing of ingots has the fewest participants. They include Erie Forge & Steel Corp., Erie, Pa., which is installing stream degassing capacity of 4,800,000 lb a year. Bethlehem Steel Co., Bethlehem, Pa., also is installing stream degassing equipment. U.S. Steel Corp. has been experimenting with the vacuum casting of large forging ingots at its Duquesne, Pa., Works.

Several other steel and forging companies are looking at vacuum casting of ingots for forging and for producing heavy plates. Casting them in a vacuum removes gases that otherwise would be trapped in the steel. Vacuum cast steel is said to be excellent for forgings where quality requirements are exceptionally high.

How They Differ—In vacuum casting, the steel is air melted, then cast into a mold within a vacuum.

Vacuum induction melted steels

ENGINEERS... DESIGNERS... P.A.'S

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are produced and cast in a vacuum, using a ceramic crucible. This method does not need air or slag like the common electric furnace. Contamination from air and slag is eliminated.

The consumable electrode remelting process uses ingots that have been cast in air from a conventional electric furnace, or ingots that have been made by the vacuum induction method. The ingots are used as electrodes and are electric arc melted (consumed) inside a cold crucible arc furnace. Melting releases any gases that may have been in the ingots. They are sucked out by the vacuum in the furnace. The consumable electrode remelting process not only is free from air and slag, but it is free from refractory contamination. It is free from refractory contamination because the melting is done in a water-cooled, copper crucible. Only a small part of the remelted alloy is molten; quick chilling and solidification of it are believed to improve the structure of the material.

Imported Steel Prices Mixed

The trend in imported steel prices is mixed in some lines, but from an over-all standpoint the market is fairly steady. Deformed bars from western Europe are off $12 a ton and basic bessemer plates $15 a ton. Wire rods, on the other hand, are up $4. Other major products are unchanged.

Structural Shapes . . .

Structural Shape Prices, Page 146

Fabricated structural steel prices for the long term (delivery 12 months and beyond) in New England reflect higher costs for material and labor to a greater extent than volume to be shipped earlier. Smaller district shops with less forward bridge work are quoting well under some of the larger fabricators covering a broader field of activity.

Some backing up of fabricated steel tonnage at the structural shops is resulting from the construction slowdown being caused by the strike in the cement industry. Continuation of the strike another couple of weeks will seriously hamper operations.

Fabricators are aggressively

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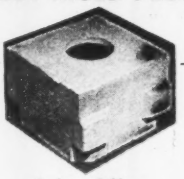

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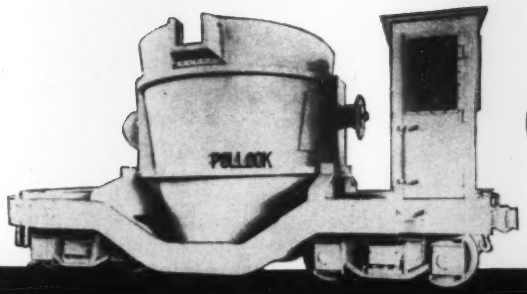
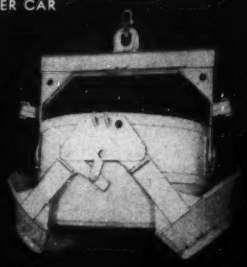
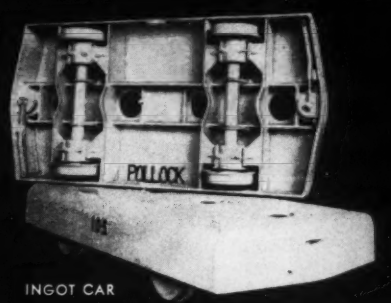


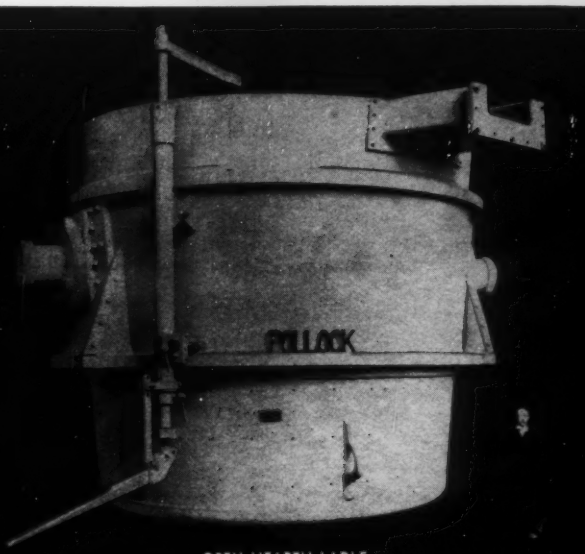
HOT METAL TRANSFER CAR

ELECTRIC FURNACE CHARGING BUCKET

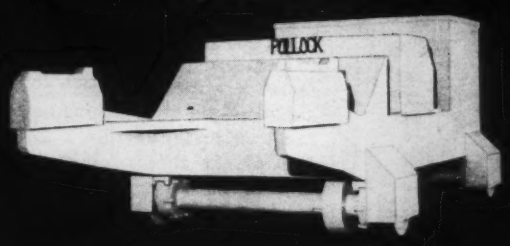




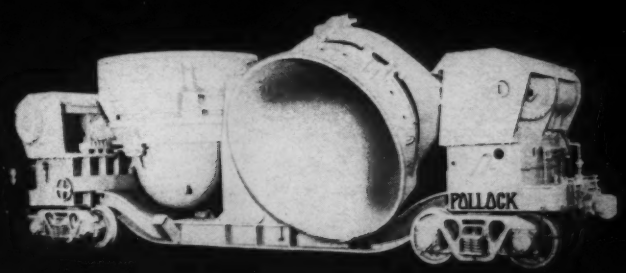
INGOT CAR



OPEN HEARTH LADLE



FRONT-FLUSH SLAG CAR



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seeking new jobs. The easing in supplies of structurals gives them more freedom in bidding. Most light angles and channels are easier to obtain now than in the first quarter. Even wide flange beams are freer. Production difficulties at a mill in the Chicago district may result in the shipment of some beams from Pittsburgh to that area.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 147 & 148

Sheet demand continues sluggish, but it is picking up slightly. Bookings for August rolling will be definitely ahead of those in July, and the general expectation is that September volume will be still better.

Automotive requirements are expected to be up substantially by that time. Specialties, such as enameling stock and electrical sheets, will also be moving more actively then. Sellers will be in position to give prompt shipments until September within normal lead time.

Pittsburgh area mills have excess capacity this month, and they are offering what could be classified as nearly warehouse-type service. One district maker reports automotive orders for August shipment show marked improvement over July's.

Steel Bars . . .

Bar Prices, Page 146

Hot-rolled carbon bar demand is improving. The mills still have considerable open space in August schedules, but they are confident that shipments then will be heavier than in July.

Current specifications are diversified, with no special activity in any one consuming area of the market. The mills are still filling prompt shipment orders (in one week) at Pittsburgh.

Agricultural equipment demand remains slow, but spot inquiries for late third quarter shipment are noted, indicating a probable upturn in consumption then. Machine tool builders are placing some August shipment orders.

July will be the dullest month this year for the cold-finished bar mills.

Wire . . .

Wire Prices, Pages 148 & 149

The wire mills are resuming production (after vacations) with thin order backlogs for August. New buying is light and while inventories are depleted in many cases, fill-in buying continues with procurement schedules building up for September shipments. The ability of producers of most standard carbon grades and sizes to make prompt shipments contributes to this policy.

Reaction to the recent price increase is less vocal than it was earlier in the year when base prices and extras were advanced. At that time, manufacturers of fasteners, notably screws, claimed they were unable to pass their higher costs in February. They are skeptical of doing so on the latest steel increase since they are operating at only about 50 per cent of capacity under highly competitive conditions. The industry is plagued by overcapacity for machine screws and specialties, enhanced by imports of wood screws.

Furniture spring coilers also are running only about 50 per cent.

Reinforcing Bars . . .

Semifinished Prices, Page 146

Reinforcing bar fabricators are being adversely affected by slowed construction resulting from the cement industry strike. Continuation of the tie-up for another two weeks will have serious repercussions on building in general over the country.

Demand for bars is tapering in New England but distributors' backlogs are heavy. Building requirements for schools are holding up better than for bridges. On the Pacific Coast, demand is less pressing, except for school projects. Some large construction projects in the Los Angeles area have been delayed by a strike of maintenance and plumbing unions.

Stainless Steel . . .

Stainless Steel Prices, Page 150

Land and buildings of the Louis Berkman Co. at Louisville, O., near Canton, O., will be purchased by Jones & Laughlin Steel Corp. It

(*Please turn to page* 153)

Imported Steel

Prices per 100 lbs. (except where otherwise noted) landed, including customs duty, but no other taxes.

	Atlantic & Gulf Coast	West Coast	Vancouver	Montreal
Deformed Bars (¾" Dia. incl. all extras)	$6.78	$7.01	$6.76	$6.44
Merchant Bars (¼" Round incl. all extras)...	7.62	7.85	7.48	7.22
Bands (1"x¼"x20' incl. all extras)	7.76	7.98	7.65	7.38
Angles (2"x2"x¼" incl. all extras)	6.57	6.75	6.99	6.69
Beams & Channels (base)	6.82	7.00	7.24	6.94
Furring Channels (C.R. ¾", per 1000')	26.62	27.77	32.77	31.80
Barbed Wire (per 82 lb. net reel)	6.95	7.40	7.75	7.80
Nails (bright, common, 20d and heavier)	8.38	8.58	9.07	8.99
Larssen Sheet Piling (section II, new, incl. size extra)	7.80	8.10	8.10	7.80
Wire, Manufacturer's, bright, low C. (11½ ga.)	7.38	7.52	8.52	8.52
Wire, galvanized, low C. (11½ ga.)	8.01	8.15	9.42	9.42
Wire, Merchant quality, bl. ann., (10 ga.)...	7.60	7.75	8.78	8.78
Rope Wire (.045", 247,000 PSI, incl. extras)..	13.60	13.75	13.00	13.00
Wire, fine and weaving, low C. (20 ga.)	10.66	10.80	10.17	12.17
Tie Wire, autom. baler (14G, 97 lbs. net)....	9.58	9.73	9.64	9.54
Merchant Pipe (½" galv. T & C. per 100')...	8.48	8.83	...	...
Casing (5½", 15.5 J55, T & C. per 100')	194.00	199.00	...	...
Tubing (2⅞", 6.4 J55, EUE, per 100')	103.00	104.00	...	...
Forged R. Turn. Bars, C-1035 (from 10" dl.)	14.00	14.23	14.00	13.74

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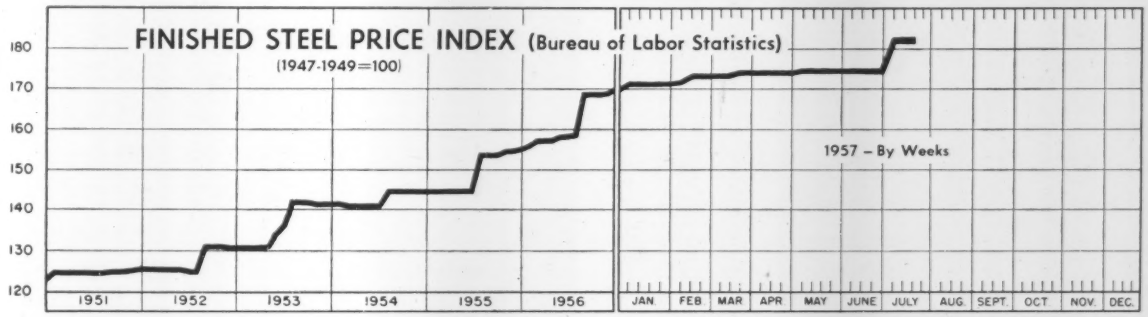
Price Indexes and Composites



July 16, 1957	Week Ago	Month Ago	June Avg.	Year Ago
181.3	181.3	174.3	174.3	158.6

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended July 16

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.600
Rails, Light, 40 lb	7.067
Tie Plates	6.600
Axles, Railway	9.825
Wheels, Freight Car, 33 in. (per wheel)	60.00
Plates, Carbon	6.150
Structural Shapes	5.942
Bars, Tool Steel, Carbon (lb)	0.480
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.585
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.769
Bars, H.R., Alloy	10.525
Bars, H.R., Stainless, 303 (lb)	0.525
Bars, H.R., Carbon	6.425
Bars, Reinforcing	6.210
Bars, C.F., Carbon	10.360
Bars, C.F., Alloy	13.875
Bars, C.F., Stainless, 302 (lb)	0.553
Sheets, H.R., Carbon	6.192
Sheets, C.R., Carbon	7.089
Sheets, Galvanized	8.220
Sheets, C.R., Stainless, 302 (lb)	0.688
Sheets, Electrical	12.108
Strip, C.R., Carbon	9.143
Strip, C.R., Stainless, 430 (lb)	0.493
Strip, H.R., Carbon	6.245
Pipe, Black, Buttweld (100 ft)	19.814
Pipe, Galv., Buttweld (100 ft)	23.264
Pipe, Line (100 ft)	199.025
Casing, Oil Well, Carbon (100 ft)	194.499
Casing, Oil Well, Alloy (100 ft)	304.610
Tubes, Boiler (100 ft)	47.653
Tubing, Mechanical, Carbon (100 ft)	24.470
Tubing, Mechanical, Stainless, 304 (100 ft)	199.735
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483
Black Plate, Canmaking Quality (95 lb base box)	7.583
Wire, Drawn, Carbon	10.225
Wire, Drawn, Stainless, 430 (lb)	*0.655*
Bale Ties (bundle)	7.967
Nails, Wire, 8d Common	9.828
Wire, Barbed (80-rod spool)	*8.719*
Woven Wire Fence (20-rod roll)	21.740

STEEL's FINISHED STEEL PRICE INDEX*

	July 17 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	239.15	239.15	228.59	210.45	171.92
Index in cents per lb	6.479	6.479	6.193	5.701	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$146.19	$145.74	$140.24	$131.27	$106.32
No. 2 Fdry Pig Iron, GT	66.27	64.70	64.70	60.84	52.54
Basic Pig Iron, GT	65.68	64.23	64.23	59.96	52.16
Malleable Pig Iron, GT	67.06	65.77	65.77	61.45	53.27
Steelmaking Scrap, GT	54.33	55.17	55.67	46.50	42.50

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	July 17 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.425	5.425	5.075	4.65	3.70
Bars, H.R., Chicago	5.425	5.425	5.075	4.65	3.70
Bars, H.R., deld., Philadelphia	5.715	5.715	5.365	4.93	4.252
Bars, C.F., Pittsburgh	7.30*	7.30*	6.85*	6.25*	4.55
Shapes, Std., Pittsburgh	5.275	5.275	5.00	4.60	3.65
Shapes, Std., Chicago	5.275	5.275	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.585	5.585	5.31	5.00	3.93
Plates, Pittsburgh	5.10	5.10	4.85	4.50	3.70
Plates, Chicago	5.10	5.10	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.50	5.50	5.25	4.80	4.15
Plates, Sparrows Point, Md.	5.10	5.10	4.85	4.50	3.70
Plates, Claymont, Del.	5.70	5.70	5.70	5.35	4.15
Sheets, H.R., Pittsburgh	4.925	4.925	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.925	4.925	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	6.05	6.05	5.75	5.325	4.35
Sheets, C.R., Chicago	6.05	6.05	5.75	5.325	4.35
Sheets, C.R., Detroit	6.05-6.15	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.60	6.60	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.925	4.925	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.925	4.925	4.675	4.325	3.50
Strip, C.R., Pittsburgh	7.15	7.15	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	7.15	7.15	6.85	6.25-6.35	4.90
Strip, C.R., Detroit	7.25	7.25	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.65	7.65	7.20	6.60	4.85-5.10
Nails, Wire, Pittsburgh	8.95	8.95	8.49	7.60	5.90-6.20
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$9.85	$8.70

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$96.00	$96.00	$91.50	$84.50	$66.00
Wire rods, 1/2-5/8" Pitts.	6.15	6.15	5.80	5.375	4.10-4.30

PIG IRON, Gross Ton	July 17 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$65.50	$65.50	$62.25	$53.00
Basic, Valley	64.50	64.50	64.50	60.00	52.00
Basic, deld., Phila.	69.88	68.38	68.38	66.26	56.75
No. 2 Fdry, Neville Island, Pa.	66.50	65.00	65.00	63.00	52.50
No. 2 Fdry, Chicago	66.50	65.00	65.00	60.50	52.50
No. 2 Fdry, deld., Phila.	70.38	68.88	68.88	66.76	57.25
No. 2 Fdry, Birm.	62.50	59.00	59.00	57.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	70.20	66.70	66.70	62.70	56.43
Malleable, Valley	65.00	65.00	65.00	60.50	52.50
Malleable, Chicago	66.50	65.00	65.00	60.50	52.50
Ferromanganese, Duquesne	255.00†	255.00†	255.00†	215.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$55.50	$56.50	$56.50	$44.50	$44.00
No. 1 Heavy Melt, E. Pa.	54.50	56.00	56.50	49.00	41.00
No. 1 Heavy Melt, Chicago	53.00	53.00	54.00	46.00	42.50
No. 1 Heavy Melt, Valley	54.50	54.50	54.50	45.50	44.00
No. 1 Heavy Melt, Cleve.	51.50	51.50	51.50	43.50	43.00
No. 1 Heavy Melt, Buffalo	46.50	46.50	46.50	42.50	37.00
Rails, Rerolling, Chicago	76.50	76.50	74.50	67.50	52.50
No. 1 Cast, Chicago	47.50	47.50	48.50	45.50	45.00

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$14.125	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.00	18.00	16.50	17.50

Steel Prices

Mill prices as reported to STEEL, July 17, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 147; to footnotes, page 149.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$73.50

INGOTS, Alloy (NT)
Detroit S41 ....$77.00
Farrell,Pa. S3 ....77.00
Lowellville,O. S3 ....77.00
Midland,Pa. C18 ....77.00
Munhall,Pa. U5 ....77.00
Sharon,Pa. S3 ....77.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$77.50
Bridgeport,Conn. N19 ..80.50
Buffalo R2 ....77.50
Clairton,Pa. U5 ....77.50
Ensley,Ala. T2 ....77.50
Fairfield,Ala. T2 ....77.50
Fontana,Calif. K1 ....88.00
Gary,Ind. U5 ....77.50
Johnstown,Pa. B2 ....77.50
Lackawanna,N.Y. B2 ..77.50
Munhall,Pa. U5 ....77.50
S.Chicago,Ill. R2, U5 ..77.50
S.Duquesne,Pa. U5 ....77.50
Sterling,Ill. N15 ....77.50
Youngstown R2 ....77.50

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$96.00
Bridgeport,Conn. N19..101.00
Buffalo R2 ....96.00
Canton,O. R2 ....98.50
Clairton,Pa. U5 ....96.00
Conshohocken,Pa. A3 101.00
Ensley, Ala. T2 ....96.00
Fairfield,Ala. T2 ....96.00
Fontana,Calif. K1 ....105.50
Gary,Ind. U5 ....96.00
Geneva,Utah C11 ....96.00
Houston S5 ....101.00
Johnstown,Pa. B2 ....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 ....105.50
Midland,Pa. C18 ....96.00
Munhall,Pa. U5 ....96.00
Seattle B3 ....109.50
Sharon,Pa. S3 ....96.00
S.Chicago R2,U5,W14 96.00
S.Duquesne,Pa. U5 ....96.00
S.SanFrancisco B3 ...105.50
Warren,O. C17 ....96.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$114.00
Bridgeport,Conn. N19 .114.00
Buffalo R2 ....114.00
Canton,O. R2, T7 ....114.00
Conshohocken,Pa. A3 121.00
Detroit S41 ....114.00
Farrell,Pa. S3 ....114.00
Fontana,Calif. K1 ....135.00
Gary,Ind. U5 ....114.00
Houston S5 ....119.00
Ind.Harbor,Ind. Y1 ..114.00
Johnstown,Pa. B2 ....114.00
Lackawanna,N.Y. B2 114.00
LosAngeles B3 ....134.00
Lowellville,O. S3 ....114.00
Massillon,O. R2 ....114.00
Midland,Pa. C18 ....114.00
Munhall,Pa. U5 ....114.00
Sharon,Pa. S3 ....114.00
S.Chicago R2,U5,W14 114.00
S.Duquesne,Pa. U5 ..114.00
Struthers,O. Y1 ....114.00
Warren,O. C17 ....114.00

ROUNDS, SEAMLESS TUBE (NT)
Bridgeport,Conn. N19 .$122.50
Buffalo R2 ....117.50
Canton,O. R2 ....120.00
Cleveland,O. R2 ....117.50
Gary,Ind. U5 ....117.50
S.Chicago,Ill. R2, W14 117.50
S.Duquesne,Pa. U5 ..117.50
Warren,O. C17 ....117.50

SKELP
Aliquippa,Pa. J5 ....5.075
LoneStar,Tex. L6 ....5.025
Munhall,Pa. U5 ....4.875
Warren,O. R2 ....4.875
Youngstown R2, U5 ..4.875

WIRE RODS
AlabamaCity,Ala. R2 ..6.15
Aliquippa,Pa. J5 ....6.15
Alton,Ill. L1 ....6.35
Buffalo W12 ....5.80
Cleveland A7 ....6.15
Donora,Pa. A7 ....6.15
Fairfield,Ala. T2 ....6.15
Houston S5 ....6.40
IndianaHarbor,Ind. Y1..6.15
Johnstown,Pa. B2 ....6.15
Joliet,Ill. A7 ....6.15
KansasCity,Mo. S5 ....6.40
Kokomo,Ind. C16 ....6.25
LosAngeles B3 ....6.95
Minnequa,Colo. C10 ....6.40
Monessen,Pa. P17 ....6.15
N.Tonawanda,N.Y. B11..5.80
Pittsburg,Calif. C11 ....6.95
Portsmouth,O. P12 ....6.15
Roebling,N.J. R5 ....6.25
S.Chicago,Ill. R2 ....6.15
SparrowsPoint,Md. B2 ..6.25
Sterling,Ill.(1) N15 ....6.15
Sterling,Ill. N15 ....6.25
Struthers,O. Y1 ....6.15
Worcester,Mass. A7 ....6.45

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 ....5.275
Atlanta A11 ....5.20
Aliquippa,Pa. J5 ....5.275
Bessemer,Ala. T2 ....5.275
Bethlehem,Pa. B2 ....5.325
Birmingham C15 ....5.275
Clairton,Pa. U5 ....5.275
Fairfield,Ala. T2 ....5.275
Fontana,Calif. K1 ....6.025
Gary,Ind. U5 ....5.275
Geneva,Utah C11 ....5.275
Houston S5 ....5.375
Ind.Harbor,Ind. I-2 ..5.275
Johnstown,Pa. B2 ....5.325
Joliet,Ill. P22 ....5.275
KansasCity,Mo. S5 ....5.375
Lackawanna,N.Y. B2 ..5.325
LosAngeles B3 ....5.975
Minnequa,Colo. C10 ..5.575
Munhall,Pa. U5 ....5.275
Niles,Calif. P1 ....5.925
Phoenixville,Pa. P4 ....5.50
Portland,Oreg. O4 ....6.025
Seattle B3 ....6.025
S.Chicago,Ill. U5, W14 5.275
S.SanFrancisco B3 ....5.925
Sterling,Ill. N15 ....5.275
Torrance,Calif. C11 ....5.975
Weirton,W.Va. W6 ....5.275

Wide Flange
Bethlehem,Pa. B2 ..5.325
Clairton,Pa. U5 ....5.275
Fontana,Calif. K1 ....6.225
IndianaHarbor,Ind. I-2 5.525
Lackawanna,N.Y. B2 ..5.325
Munhall,Pa. U5 ....5.275
Phoenixville,Pa. P4 ....5.50
S.Chicago,Ill. U5 ....5.275

Alloy Std. Shapes
Aliquippa,Pa. J5 ....6.55
Clairton,Pa. U5 ....6.55
Gary,Ind. U5 ....6.55
Houston S5 ....6.65
Munhall,Pa. U5 ....6.55
S.Chicago,Ill. U5 ....6.55

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 ....7.75
Bessemer,Ala. T2 ....7.75
Bethlehem,Pa. B2 ....7.80
Clairton,Pa. U5 ....7.75
Fairfield,Ala. T2 ....7.75
Fontana,Calif. K1 ....8.50
Gary,Ind. U5 ....7.75
Geneva,Utah C11 ....7.75
Houston S5 ....7.85
Ind.Harbor,Ind. I-2, Y1 7.75
Johnstown,Pa. B2 ....7.80
KansasCity,Mo. S5 ....7.85
Lackawanna,N.Y. B2 ..7.80
LosAngeles B3 ....8.45
Munhall,Pa. U5 ....7.75
Seattle B3 ....8.50
S.Chicago,Ill. U5, W14 ..7.75
S.SanFrancisco B3 ....8.40
Struthers,O. Y1 ....7.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ....7.80
Lackawanna,N.Y. B2 ..7.80
Munhall,Pa. U5 ....7.75
S.Chicago,Ill. U5 ....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.325
Lackawanna,N.Y. B2 .5.325
Munhall,Pa. U5 ....5.275
S.Chicago,Ill. U5 ....5.275

STEEL SHEET PILING
Lackawanna,N.Y. B2 ..6.225
Munhall,Pa. U5 ....6.225
S.Chicago,Ill. U5 ....6.225

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 ....5.10
Aliquippa,Pa. J5 ....5.10
Ashland,Ky. (15) A10 5.10
Bessemer,Ala. T2 ....5.10
Clairton,Pa. U5 ....5.10
Claymont,Del. C22 ....5.70
Cleveland J5, R2 ....5.20
Coatesville,Pa. L7 ....5.50
Conshohocken,Pa. A3 ..5.20
Ecorse,Mich. G5 ....5.20
Fairfield,Ala. T2 ....5.10
Fontana,Calif.(30) K1 ..5.85
Gary,Ind. U5 ....5.10
Geneva,Utah C11 ....5.10
GraniteCity,Ill. G4 ....5.30
Harrisburg,Pa. P4 ....5.80
Houston S5 ....5.20
Ind.Harbor,Ind. I-2, Y1 5.10
Johnstown,Pa. B2 ....5.10
Lackawanna,N.Y. B2 ..5.10
LoneStar,Tex. L6 ....5.45
Mansfield,O. E6 ....5.10
Minnequa,Colo. C10 ...5.95
Munhall,Pa. U5 ....5.10
Newport,Ky. A2 ....5.10
Pittsburgh J5 ....5.10
Riverdale,Ill. A1 ....5.10
Seattle B3 ....6.00
Sharon,Pa. S3 ....5.10
S.Chicago,Ill. U5, W14 5.10
SparrowsPoint,Md. B2 ..5.10
Sterling,Ill. N15 ....5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 ....5.10
Youngstown R2, U5, Y1.5.10

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.35
Fontana,Calif. K1 ....7.50
Geneva, Utah C11 ....6.75
Johnstown,Pa. B2 ....7.00
SparrowsPoint,Md. B2 ..7.00

PLATES, Wrought Iron
Economy,Pa. B14 ....13.15

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ....7.625
Bessemer,Ala. T2 ....7.625
Clairton,Pa. U5 ....7.625
Claymont,Del. C22 ....7.625
Cleveland J5, R2 ....7.625
Coatesville,Pa. L7 ....7.55
Conshohocken,Pa. A3..7.625
Ecorse,Mich. G5 ....7.725
Fairfield,Ala. T2 ....7.625
Farrell,Pa. S3 ....7.625
Fontana,Calif.(30) K1..8.375
Gary,Ind. U5 ....7.625
Geneva,Utah C11 ....7.625
Houston S5 ....7.725
Ind.Harbor,Ind. I-2, Y1 7.625
Johnstown,Pa. B2 ....7.625
Munhall,Pa. U5 ....7.625
Pittsburgh J5 ....7.625
Seattle B3 ....8.525
Sharon,Pa. S3 ....7.625
S.Chicago,Ill. U5, W14 7.625
SparrowsPoint,Md. B2 7.625
Warren,O. R2 ....7.625
Youngstown U5 ....7.625

PLATES, Alloy
Aliquippa,Pa. J5 ....7.20
Claymont,Del. C22 ....7.20
Coatesville,Pa. L7 ....7.20
Farrell,Pa. S3 ....7.20
Fontana,Calif.(30) K1..7.95
Gary,Ind. U5 ....7.20
Houston S5 ....7.30
Ind.Harbor,Ind. Y1 ....7.20
Johnstown,Pa. B2 ....7.20
Lowellville,O. S3 ....7.20
Munhall,Pa. U5 ....7.20
Newport,Ky. A2 ....7.20
Pittsburgh J5 ....7.20
Seattle B3 ....8.10
Sharon,Pa. S3 ....7.20
S.Chicago,Ill. U5, W14 7.20
SparrowsPoint,Md. B2 ..7.20
Youngstown Y1 ....7.20

FLOOR PLATES
Cleveland J5 ....6.175
Conshohocken,Pa. A3 ..6.175
Harrisburg,Pa. P4 ....6.275
Ind.Harbor,Ind. I-2 ..6.175
Munhall,Pa. U5 ....6.175
S.Chicago,Ill. U5 ....6.175

PLATES, Ingot Iron
Ashland c.l. (15) A10..5.35
Ashland l.c.l. (15) A10..5.85
Cleveland c.l. R2 ....5.85
Warren,O. c.l. R2 ....5.85

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.425
Aliquippa,Pa.(9) J5 ....5.425
Alton,Ill. L1 ....5.625
Atlanta(9) A11 ....5.275
Bessemer,Ala.(9) T2 ..5.425
Birmingham(9) C15 ...5.425
Bridgeport,Conn.(9) N19 5.65
Buffalo(9) R2 ....5.425
Clairton,Pa.(9) U5 ....5.425
Cleveland(9) R2 ....5.425
Ecorse,Mich.(9) G5 ...5.525
Emeryville,Calif. J7 ....6.175
Fairfield,Ala. 9) T2 ..5.425
Fairless,Pa.(9) U5 ....5.575
Fontana,Calif.(9) K1 ..6.125
Gary,Ind.(9) U5 ....5.425
Houston(9) S5 ....5.675
Ind.Harbor(9) I-2, Y1 5.425
Johnstown,Pa.(9) B2 ..5.425
Joliet,Ill. P22 ....5.425
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
LosAngeles(9) B3 ....6.125
Milton,Pa. M18 ....5.575
Minnequa,Colo. C10 ...5.875
Niles,Calif. P1 ....6.125
N.T'wanda,N.Y.(9)B11 5.425
Pittsburg,Calif.(9) C11 6.125
Pittsburgh(9) J5 ....5.425
Portland,Oreg. O4 ....6.175
Seattle B3, N14 ....6.175
S.Ch'c'go(9)R2,U5,W14 5.425
S.Duquesne,Pa.(9) U5 .5.425
S.SanFran.,Calif.(9)B3 6.175
Sterling,Ill.(1)(9) N15..5.425
Sterling,Ill.(9) N15 ..5.525
Struthers,O. Y1 ....5.425
Tonawanda,N.Y. B12 ..5.425
Torrance,Calif.(9) C11 6.125
Youngstown(9) R2, U5 5.425

BARS, H.R. Leaded Alloy (Including leaded extra)
Warren,O. C17 ....7.475

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.475
Bethlehem,Pa. B2 ....6.475
Bridgeport,Conn. N19 ..6.55
Buffalo R2 ....6.475
Canton,O. R2, T7 ....6.475
Clairton,Pa. U5 ....6.475
Detroit S41 ....6.475
Ecorse,Mich. G5 ....6.575
Fairless,Pa. U5 ....6.625
Farrell,Pa. S3 ....6.475
Fontana,Calif. K1 ....7.525
Gary,Ind. U5 ....6.475
Houston S5 ....6.725
Ind.Harbor,Ind. I-2, Y1 6.475
Johnstown,Pa. B2 ....6.475
KansasCity,Mo. S5 ....6.725
Lackawanna,N.Y. B2 ..6.475
Lowellville,O. S3 ....6.475
LosAngeles B3 ....7.525
Massillon,O. R2 ....6.475
Midland,Pa. C18 ....6.475
Pittsburgh J5 ....6.475
Sharon,Pa. S3 ....6.475
S.Chicago R2, U5, W14 6.475
S.Duquesne,Pa. U5 ....6.475
Struthers,O. Y1 ....6.475
Warren,O. C17 ....6.475
Youngstown U5 ....6.475

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy
Aliquippa,Pa. J5 ....7.925
Bessemer,Ala. T2 ....7.925
Bethlehem,Pa. B2 ....7.425
Bridgeport,Conn. N19 ..7.95
Clairton,Pa. U5 ....7.925
Cleveland R2 ....7.925
Ecorse,Mich. G5 ....8.025
Fairfield,Ala. T2 ....7.925
Fontana,Calif. K1 ....8.625
Gary,Ind. U5 ....7.925
Houston S5 ....8.175
Ind.Harbor,Ind. Y1 ..7.925
Johnstown,Pa. B2 ....7.425
KansasCity,Mo. S5 ....8.175
Lackawanna,N.Y. B2 ..7.425
LosAngeles B3 ....8.625
Pittsburgh J5 ....7.925
Seattle B3 ....8.675
S.Chicago,Ill. U5, W14 7.925
S.Duquesne,Pa. U5 ....7.925
S.SanFrancisco B3 ....8.675
Struthers,O. Y1 ....7.925
Youngstown U5 ....7.925

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.575
Houston(9) S5 ....5.675
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
Sterling,Ill. N15 ....5.525
Sterling,Ill.(1) N15 ..5.425
Tonawanda,N.Y. B12 ..5.425

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ....5.425
Atlanta A11 ....5.575
Joliet,Ill. P22 ....5.425
Niles,Calif. P1 ....6.125
Pittsburgh J5 ....5.425
Portland,Oreg. O4 ....6.175
SanFrancisco S7 ....6.275
Seattle B3 ....6.175

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.55
Clairton,Pa. U5 ....6.55
Gary,Ind. U5 ....6.55
Houston S5 ....6.80
KansasCity,Mo. S5 ....6.80
Pittsburgh J5 ....6.55
Youngstown U5 ....6.55

BARS, C.F., Leaded Alloy (Including leaded extra)
Ambridge,Pa. W18 ....9.475
BeaverFalls,Pa. M12 ..9.925
Camden,N.J. P13 ....10.10
Chicago W18 ....9.475
Cleveland C20 ....9.475
LosAngeles P2, S30 (Gr. A) 11.30
(Gr. B) 11.80
Monaca,Pa. S17 ....9.925
Newark,N.J. W18 ....9.65
SpringCity,Pa. K3 ....10.10
Warren,O. C17 ....9.925

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.30
BeaverFalls,Pa. M12,R2 7.30
Birmingham C15 ....7.90
Bridgeport,Conn. N19 ..7.65
Buffalo B5 ....7.85
Camden,N.J. P13 ....7.75
Carnegie,Pa. C12 ....7.30
Chicago W18 ....6.85
Cleveland A7, C20 ....7.30
Detroit 35, P17 ....7.50
Detroit S41 ....7.30
Donora,Pa. A7 ....7.30
Elyria,O. W8 ....7.30
FranklinPark,Ill. N5 ....7.30
Gary,Ind. R2 ....7.30
GreenBay,Wis. F7 ....7.30
Hammond,Ind. L2 ....7.55
Hammond,Ind. J5 ....7.30
Hartford,Conn. R2 ....7.80
Harvey,Ill. B5 ....7.30
LosAngeles P2, S30 ....8.75
LosAngeles R2 ....9.20
Mansfield,Mass. B5 ....7.85
Massillon,O. R2 ....7.30
Massillon,O. R8 ....7.30
Midland,Pa. C18 ....7.30
Monaca,Pa. S17 ....7.30
Newark,N.J. W18 ....7.75
NewCastle,Pa.(17) B4 ..7.30
Pittsburgh J5 ....7.30
Plymouth,Mich. P5 ....7.55
Putnam,Conn. W18 ....7.85
Readville,Mass. C14 ....7.85
S.Chicago,Ill. W14 ....7.30
SpringCity,Pa. K3 ....7.75
Struthers,O. Y1 ....7.30
Willimantic,Conn. J5 ....7.80
Waukegan,Ill. A7 ....7.30
Youngstown F3, Y1 ....7.30

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19..6.10

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....8.775
BeaverFalls,Pa.M12,R2 8.775
Bethlehem,Pa. B2 ....8.775
Bridgeport,Conn. N19 ..8.925
Buffalo B5 ....8.775
Camden,N.J. P13 ....8.95
Canton,O. T7 ....8.775
Carnegie,Pa. C12 ....8.775
Chicago W18 ....8.325
Cleveland A7, C20 ....8.775
Detroit B5, P17 ....8.975
Detroit S41 ....8.775
Donora,Pa. A7 ....8.775
Elyria,O. W8 ....8.775
FranklinPark,Ill. N5 ....8.775
Gary,Ind. R2 ....8.775
GreenBay,Wis. F7 ....8.775
Hammond,Ind. L2 ....11.875
Hammond,Ind. J5 ....8.775
Hartford,Conn. R2 ....9.075
Harvey,Ill. B5 ....8.775
Lackawanna,N.Y. B2 ..8.775
Los Angeles P2, S30...10.65
Mansfield,Mass. B5 ....9.075
Massillon,O. R2 ....8.775
Massillon,O. R8 ....8.775
Midland,Pa. C18 ....8.775
Monaca,Pa. S17 ....8.775
Newark,N.J. W18 ....8.95
Plymouth,Mich. P5 ....8.975
S.Chicago W14 ....8.775
SpringCity,Pa. K3 ....8.95
Struthers,O. Y1 ....8.775
Warren,O. C17 ....8.775
Waukegan,Ill. A7 ....8.775
Worcester,Mass. A7 ....9.075
Youngstown F3, Y1 ..8.775

BARS, Reinforcing (To Fabricators)
Ala.City,Ala. R2 ....5.425
Atlanta A11 ....5.275
Birmingham C15 ....5.425
Bridgeport,Conn. N19 ...5.65
Buffalo R2 ....5.425
Cleveland R2 ....5.425
Ecorse,Mich. G5 ....5.775
Emeryville,Calif. J7 ....6.175

Fairfield,Ala. T2 .....5.425
Fairless,Pa. U5 .....5.575
Fontana,Calif. K1 ....5.775
Ft.Worth,Tex.(4)(26)T4 5.875
Gary,Ind. U5 .....5.425
Houston S5 .....5.675
Ind.Harbor,Ind. I-2,Y1 5.425
Johnstown,Pa. B2 ....5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo. S5 ....5.675
Lackawanna,N.Y. B2 ..5.425
LosAngeles B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ...5.875
Niles,Calif. P1 .....6.125
Pittsburg,Calif. C11 ..6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 .....6.175
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.175
S.Chicago,Ill. R2 ....5.425
S.Duquesne,Pa. U5 ...5.425
S.SanFrancisco B3 ....6.175
SparrowsPoint,Md. B2. .5.425
Sterling,Ill.(1) N15 ...5.425
Sterling,Ill. N15 .....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ....6.00
Torrance,Calif. C11 ....6.125
Youngstown R2, U5 ..5.425

BARS, Reinforcing
(Fabricated; to Consumers)

Boston B2 .....7.30
Chicago U8 .....6.91
Cleveland U8 .....6.89
Johnstown,Pa. ¼-1" B2 6.73
KansasCity,Mo. S5 .....7.35
Lackawanna,N.Y. B2 ..6.50
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.55
Pittsburgh J5, U8 .....7.10
Seattle B3, N14 .....7.70
SparrowsPt. ⅛-1" B2 ..6.73
Williamsport,Pa. S19 ....7.00

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.325
ChicagoHts.(4)(44) I-2 5.425
ChicagoHts.(4) C2 ....5.425
Ft.Worth,Tex.(26) T4..5.875
Franklin,Pa.(3) F5 ...5.325
Franklin,Pa.(4) F5 ...5.425
JerseyShore,Pa.(4) J8 ..5.10
Marion,O.(3) P11 ....5.10
Tonawanda(3) B12 ....5.325
Tonawanda(4) B12 ....6.00
Williamsport,Pa.(3) S19 5.50

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 ..14.45
Economy,Pa.(D.R.)B14 .18.00
Economy(Staybolt)B14 ..18.45

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala.City,Ala. R2 .....4.925
Allenport,Pa. P7 .....4.925
Ashland,Ky.(8) A10 ..4.925
Cleveland J5, R2 ....4.925
Conshohocken,Pa. A3 ..4.975
Detroit(8) M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 ....4.925
Fairless,Pa. U5 .....4.975
Fontana,Calif. K1 ....5.775
Gary,Ind. U5 .....4.925
Geneva,Utah C11 ....5.025
GraniteCity,Ill.(8) G4..5.125
Ind.Harbor,Ind. I-2,Y1 4.925
Irvin,Pa. U5 .....4.925
Lackawanna,N.Y. B2..4.675
Munhall,Pa. U5 .....4.925
Newport,Ky.(8) A2 ..4.925
Niles,O. M21, S3 .....4.925
Pittsburg,Calif. C11 ..5.625
Pittsburgh J5 .....4.925
Portsmouth,O. P12 ....4.925
Riverdale,Ill. A1 ....4.925
Sharon,Pa. S3 .....4.925
S.Chicago,Ill. W14 ....4.925
SparrowsPoint,Md. B2..4.675
Steubenville,O. W10 ...4.925
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ...4.925
Youngstown U5, Y1..4.925

SHEETS, H.R., (19 Ga.& Lighter)

Niles,O. M21 .....6.05

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.10
Ind.Harbor,Ind. Y1 ....8.10
Irvin,Pa. U5 .....8.10
Munhall,Pa. U5 .....8.10
Newport,Ky. A2 .....8.10
Youngstown U5, Y1 ....8.10

SHEETS, H.R. (14 Ga.& Heavier)
High-Strength, Low-Alloy

Cleveland J5, R2 ....7.275
Conshohocken,Pa. A3..7.325
Ecorse,Mich. G5 .....7.375
Fairfield,Ala. T2 .....7.275
Fairless,Pa. U5 .....7.325
Farrell,Pa. S3 .....7.275
Fontana,Calif. K1 ....8.125
Gary,Ind. U5 .....7.275
Ind.Harbor,Ind. I-2,Y1 7.275
Irvin,Pa. U5 .....7.275
Lackawanna(35) B2 ..7.275
Munhall,Pa. U5 .....7.275
Pittsburgh J5 .....7.275
S.Chicago,Ill. U5,W14 7.275
Sharon,Pa. S3 .....7.275
SparrowsPoint(36) B2..7.275
Warren,O. R2 .....7.275
Weirton,W.Va. W6 ...7.275
Youngstown U5, Y1 ..7.275

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.675
Warren,O. R2 .....5.675

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 .....6.05
Cleveland J5, R2 .....6.05
Conshohocken,Pa. A3 ..6.10
Detroit M1 .....6.05
Ecorse,Mich. G5 .....6.15
Fairfield,Ala. T2 .....6.05
Fairless,Pa. U5 .....6.10
Follansbee,W.Va. F4 ...6.05
Fontana,Calif. K1 .....7.30
Gary,Ind. U5 .....6.05
GraniteCity,Ill. G4 ....6.25
Ind.Harbor,Ind. I-2, Y1 6.05
Irvin,Pa. U5 .....6.05
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 .....6.05
Middletown,O. A10 ....6.05
Newport,Ky. A2 .....6.05
Pittsburg,Calif. C11 ...7.00
Pittsburgh J5 .....6.05
Portsmouth,O. P12 .....6.05
SparrowsPoint,Md. B2 ..5.75
Steubenville,O. W10 .....6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 ....6.05
Yorkville,O. W10 .....6.05
Youngstown Y1 .....6.05

SHEETS, Cold-Rolled
High-Strength, Low-Alloy

Cleveland J5, R2 .....8.975
Ecorse,Mich. G5 .....9.075
Fairless,Pa. U5 .....9.025
Fontana,Calif. K1 ...10.275
Gary,Ind. U5 .....8.975
IndianaHarbor,Ind. Y1 8.975
Irvin,Pa. U5 .....8.975
Lackawanna(37) B2 ..8.975
Pittsburgh J5 .....8.975
SparrowsPoint(38) B2 8.975
Warren,O. R2 .....8.975
Weirton,W.Va. W6 ....8.975
Youngstown Y1 .....8.975

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.80
Middletown,O. A10 ....6.55
Warren,O. R2 .....6.80

SHEETS, Culvert	Cu Steel	Cu Fe
Ashland,Ky. A10	.6.95	7.20
Canton,O. R2	....6.95	7.45
Fairfield T2	.....6.95	7.20
Gary,Ind. U5	.....6.95	7.20
GraniteCity,Ill. G4	7.15	...
Ind.Harbor I-2	...6.95	7.20
Irvin,Pa. U5	.....6.95	7.20
Kokomo,Ind. C16	..7.05	...
MartinsFry. W10	*.6.95*	*7.20*
Pittsburgh J5	....6.65	...
Pitts.,Calif. C11	*7.70*	...
SparrowsPt. B2	..6.95	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ... 7.20

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City,Ala. R2 .....6.60‡
Ashland,Ky. A10 ....6.60†
Canton,O. R2 .....6.60‡
Dover,O. R1 .....6.60†
Fairfield,Ala. T2 .....6.60†
Gary,Ind. U5 .....6.60*
GraniteCity,Ill. G4 ....6.80*
Ind.Harbor,Ind. I-2 ..6.60†
Irvin,Pa. U5 .....6.60*
Kokomo,Ind. C16 .....6.70‡
MartinsFerry,O. W10 .6.60*
Middletown,O. A10 ..6.60†
Pittsburg,Calif. C11 ..7.35*
Pittsburgh J5 .....6.60†
SparrowsPt.,Md. B2 ...6.30†
Warren,O. R2 .....6.60†
Weirton,W.Va. W6 ....6.60*

•Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.275

SHEETS, Galvanized
High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.725
SparrowsPt.(39) B2 ...9.725

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.00
Irvin,Pa. U5 .....7.00

SHEETS, Galvanized Ingot Iron
(Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.85
Middletown,O. A10 ....6.85

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.425
Niles,O.(28) R2 .....7.425
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) .9.25
Butler,Pa. A10 (type 2) .9.35

SHEETS, Enameling Iron

Ashland,Ky. A10 ....6.625
Cleveland R2 .....6.625
Gary,Ind. U5 .....6.625
GraniteCity,Ill. G4 ....6.825
Ind.Harbor,Ind. I-2,Y1 6.625
Irvin,Pa. U5 .....6.625
Middletown,O. A10 ....6.625
Niles,O. M21, S3 .....6.625
Youngstown Y1 .....6.625

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...8.65
Ind.Harbor,Ind. I-2 ..8.175
Yorkville,O. W10 .....8.475

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va.W10 7.00
Gary,Ind. U5 .....7.00
Mansfield,O. E6 .....7.00
Middletown,O. A10 ....7.00
Niles,O. M21, S3 .....7.00
Warren,O. R2 .....7.00
Weirton,W.Va. W6 ....7.00

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .....7.40

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division Sharon Steel Corp.
D4 Disston Division, H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W. Co.
N19 Northeastern Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Dawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless Steel Div., J&L Steel Corp.

T2 Tenn. Coal & Iron Div., U.S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div., U.S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel&Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..4.925
Allenport,Pa. P7 .....*4.925*
Alton,Ill. L1 .....5.125
Ashland,Ky.(8) A10 ..4.925
Atlanta A11 .....4.875
Bessemer,Ala. T2 ....4.925
Birmingham C15 .....4.925
Buffalo(27) R2 .....4.925
Conshohocken,Pa. A3 ..4.975
Detroit M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 .....4.925
Fontana,Calif. K1 ....5.775
Gary,Ind. U5 .....4.925
Houston S5 .....5.175
Ind.Harbor,Ind. I-2, Y1 4.925
Johnstown,Pa.(25) B2..4.925
KansasCity,Mo. S5 ....5.175
LacKaw'na,N.Y.(25) B2 4.925
LosAngeles(25) B3 ....5.675
Minnequa,Colo. C10 ...6.025
Pittsburg,Calif. C11 ..5.675
Riverdale,Ill. A1 .....4.925
SanFrancisco S7 ..... *6.35*
Seattle(25) B3 .....5.925
Seattle N14 .....5.675
Sharon,Pa. S3 .....*4.925*
S.SanFrancisco(25) B3..5.675
S.SanFrancisco(25) B3 .5.675
SparrowsPoint,Md. B2 .4.925
Sterling,Ill.(1) N15 ....*4.925*
Sterling,Ill. N15 .....*5.025*
Torrance,Calif. C11 ...5.675
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ....4.925
Youngstown U5 .....4.925

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....7.75
Farrell,Pa. S3 .....*8.10*
Gary,Ind. U5 .....8.10
Houston S5 .....8.35
Ind.Harbor,Ind. Y1 ....8.10
KansasCity,Mo. S5 ....8.35
LosAngeles B3 .....9.30
Lowellville,O. S3 .....*8.10*
Newport,Ky A2 .....8.10
Sharon,Pa. S3 .....*8.10*
S.Chicago,Ill. W14 ....8.10
Youngstown U5, Y1 ...8.10

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2 ....7.325
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....7.425
Fairfield,Ala. T2 .....7.325
Farrell,Pa. S3 .....*7.325*
Gary,Ind. U5 .....7.325
Houston S5 .....7.575
Ind.Harbor,Ind. I-2, Y1 7.325
KansasCity,Mo. S5 ....7.575
Lackawanna,N.Y. B2 ..9.325
LosAngeles(25) B3 ....8.075
Seattle(25) B3 .....8.325
Sharon,Pa. S3 .....*7.325*
S.Chicago,Ill. W14 ....7.325
S.SanFrancisco(25) B3..8.075
SparrowsPoint,Md. B2. 9.325
Warren,O. R2 .....7.325
Weirton,W.Va. W6 ....7.325
Youngstown U5, Y1 ...7.325

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ..5.175
Warren,O. R2 .....5.675

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....*7.15*
Baltimore T6 .....7.15
Boston T6 .....7.70
Buffalo S40 .....7.15
Cleveland J5 .....*7.15*
Cleveland A7 .....7.15
Conshohocken,Pa. A3 ..7.20
Dearborn,Mich. D3 ....7.25
Detroit D2, M1, P20..7.25
Dover,O. G6 .....*7.15*
Ecorse,Mich. G5 .....7.25
Evanston,Ill. M22 .....7.25
Follansbee,W.Va. F4 ...7.15
Fontana,Calif. K1 ....9.00
FranklinPark,Ill. T6 ...7.25
Ind Harbor,Ind. Y1 ....7.15
Indianapolis C8 .....7.30
LosAngeles C1 .....9.20
NewBedford,Mass. R10 .7.60
NewBritain(10) S15 ...6.85
NewCastle,Pa. B4, E5 ..7.15
NewHaven,Conn. D2 ...7.60
NewKensington,Pa. A6..6.85
Pawtucket,R.I. R3 ....7.80
Pawtucket,R.I. N8 .....*7.70*
Pittsburgh J5 .....*7.15*
Riverdale,Ill. A1 .....7.25
Rome,N.Y.(32) R6 .....*7.15*
Sharon,Pa. S3 .....*7.15*
Trenton,N.J.(31) R5 .....*8.60*
Wallingford,Conn. W2 ..*7.60*
Warren O. R2, T5 .....7.15
Weirton,W.Va. W6 ....7.15
Worcester,Mass. A7 ....7.70
Youngstown J5, Y1 ....7.15

STRIP, Cold-Rolled Alloy

Boston T6 .....15.40
Carnegie,Pa. S18 .....14.55
Cleveland A7 .....15.25
Dover,O. G6 .....*15.05*
Farrell,Pa. S3 .....*15.05*
FranklinPark,Ill. T6 ..15.05
Harrison,N.J. C18 .....*14.85*
Indianapolis C8 .....14.70
Lowellville,O. S3 .....*15.05*
Pawtucket,R.I. N8 .....*15.40*
Riverdale,Ill. A1 .....15.05
Sharon,Pa. S3 .....*15.05*
Worcester,Mass. A7 ...15.55
Youngstown J5 .....14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.45
Dearborn,Mich. D3 ....10.60
Dover,O. G6 .....*10.45*
Ecorse,Mich. G5 .....10.55
Farrell,Pa. S3 .....*10.50*
Ind.Harbor,Ind. Y1 ...10.65
Sharon,Pa. S3 .....*10.50*
Warren,O. R2 .....10.45
Weirton,W.Va. W6 ...10.45
Youngstown Y1 .....10.65

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....7.90

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.15*
Dover,O. G6 .....*7.15**
Evanston,Ill. M22 .....7.25*
Riverdale,Ill. A1 .....7.25*
Warren,O. B9, T5 ....7.15*
Worcester,Mass. A7 ...7.70*
Youngstown J5 .....6.85*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....*7.275*

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.40
Riverdale,Ill. A1 .....5.50
Sharon,Pa. S3 .....*5.35*
Youngstown U5 .....5.35

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1		*10.70*	*12.90*	*16.10*	*19.30*
Carnegie,Pa. S18	8.65	10.10	12.30	15.30	....
Cleveland A7	8.65	10.10	12.30	15.30	18.25
Cleveland C7	....	10.10	12.30	15.30	18.25
Dearborn,Mich. D3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	*8.95*	*10.40*	*12.60*	*15.60*	*18.55*
Evanston,Ill. M22	8.95	10.40	12.60	....	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.60	15.60	18.55
Indianapolis C8	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	10.85	12.30	14.50	....	....
NewBritain,Conn.(10) S15	8.65	10.10	12.30	15.30	18.25
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven Conn. D2	9.40	10.70	12.90	15 90	....
NewKensington,Pa. A6	8.65	10.10	12.30	15.30	....
NewYork W3		*10.70*	*12.90*	*16.10*	*19.30*
Pawtucket,R.I. N8	*9.50*	*10.70*	*12.90*	*15.90*	*18.85*
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	*8.95*	*10.40*	*12.60*	*15.60*	*18.55*
Sharon,Pa. S3	*8.95*	*10.40*	*12.60*	*15.60*	*18.55*
Trenton,N.J. R5		*10.70*	*12.90*	*16.10*	*19.30*
Wallingford,Conn. W2	*9.40*	*10.70*	*12.90*	*15.90*	*18.75*
Warren,O. T5	*8.95*	*10.40*	*12.60*	*15.60*	*18.55*
Worcester,Mass. T6	*9.50*	*10.70*	*12.90*	*15.90*	*18.85*
Worcester,Mass. A7	9.20	10.40	12.60	15 60	18.55
Youngstown J5	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	*18.10*	*21.95*	*26.30*
Buffalo W12	17.10	....	....
FranklinPark,Ill. T6	17.45	21.30	25.65
Harrison N J. C18	17 10	20 95	25 30
NewYork W3	*18.10*	*21.95*	*26.30*
Palmer,Mass. W12	17 10	....	....
Trenton,N.J. R5	*18.10*	*21.95*	*26.30*
Worcester,Mass. A7, T6	17.10	20 95	25 30
Youngstown J5	17.45	21.30	25.65

SILICON STEEL

H.R. SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	....	*11.80*	*12.90*	*13.95*
Mansfield O. E6	9.625	11.10	11.80	12.90	13.95
Newport,Ky. A2	9 625	11.10	11.20	12.90	13.95
Niles,O. M21, S3	*9.625*	*11.10*	*11.80*	*12.90*	....
Vandergrift,Pa. U5	....	11.10	11.80	12 90	13.95
Warren O. R2	9.625	11.10	11.80	12.90	....
Zanesville,O. A10	....	11.10	11.80	12.90	13.95
Zanesville,O. A10 (SP coils)	....	....	11.55	12.65	13.70

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge Pa. A4	....	....	12.05	13.15	14.20
GraniteCity,Ill. G4	9.825*	11.05*	11.75*	12.85*	....
IndianaHarbor,Ind. I-2	9.625†	10.85*	11.55*	12.65*	....
Mansfield,O. E6	9.625*	11.35	12.05	13.50	14.20
Vandergrift,Pa. U5	9.625*	11.35	12.05	13.15	14.20
Warren,O. R2	9.625*	11.35	12.05	13.15	14.20
Zanesville,O. A10 (FP coils)	..	11.35	12.05	13.15	14.20

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	*15.00*	*15.55*	*16.05*	*17.10*
Vandergrift,Pa. U5	14.75	15.55	16.05	17.10
Zanesville,O. A10	15.00	15.55	16.05	17.10

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	17.60	19.20	19.70	20.20	....
Butler Pa. A10	....	....	19.20	19.70	20.20	....
Vandergrift,Pa. U5	16.60	17.60	19.20	19.70	20.20	15.25**
Warren,O. R2	....	....	....	....	....	15.25‡
Zanesville,O. A10	....	....	19.20	19.70	20.20	....

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa,Pa. J5	*7.725*	*7.925*	
Niles,O. R2	7.725	7.925	8.125

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa.J5	$10.05	$10.30
Fairfield,Ala.T2.	10.15	10.40
Fairless,Pa. U5 .	10.15	10.40
Fontana,Calif.K1	10.80	11.05
Gary,Ind. U5 ...	10.05	10.30
Irvin,Pa. U5 ...	10.05	10.30
Pitts.,Calif. C11	10.80	11.05
Sp.Pt.,Md. B2 ..	10.15	10.40
Weirton,W.Va.W6	10.05	10.30
Yorkville,O. W10	10.05	10.30

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$7.85
Fairfield,Ala. T2 .....7.95
Fairless,Pa. U5 .....7.95
Fontana,Calif. K1 .....8.60
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 ....7.95
Ind.Harbor,Ind. I-2, Y1..7.85
Irvin,Pa. U5 .....7.85

Niles,O. R2	7.85
Pittsburg,Calif. C11	8.60
SparrowsPoint,Md. B2	7.95
Weirton,W.Va. W6	7.85
Yorkville,O. W10	7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5 .....$7.50
Gary,Ind. U5 .....7.50
GraniteCity,Ill. G4 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Irvin,Pa. U5 .....7.50
Yorkville,O. W10 .....7.50

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5 .....$9.70
Irvin,Pa. U5 .....9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)

Gary,Ind. U5 .....$11.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..7.65
Aliquippa,Pa. J5 .....*7.65*
Alton,Ill. L1 .....*7.85*
Atlanta A11 .....7.85
Bartonville,Ill. K4 .....*7.75*
Buffalo W12 .....7.20
Chicago W13 .....7.65
Cleveland C20 .....7.20
Cleveland A7 .....7.65
Crawfordsville,Ind. M8..7.30
Donora,Pa. A7 .....7.65
Duluth A7 .....7.65
Fairfield,Ala. T2 .....7.65
Fostoria,O.(24) S1 .....*7.75*
Houston S5 .....7.90
Jacksonville,Fla. M8 ....7.55
Johnstown,Pa. B2 .....7.65
Joliet,Ill. A7 .....7.65
KansasCity,Mo. S5 .....7.90
Kokomo,Ind. C16 .....7.75
LosAngeles B3 .....8.60
Minnequa,Colo. C10 .....7.90
Monessen,Pa. P7, P16 ...*7.65*
N.Tonawanda,N.Y. B11.7.20
Palmer,Mass. W12 .....7.50
Pittsburg,Calif. C11 ...8.60
Portsmouth,O. P12 .....7.65
Rankin,Pa. A7 .....7.65
S.Chicago,Ill. R2 .....7.65
S.SanFrancisco C10 ....8.60
SparrowsPoint,Md. B2 ..7.75
Sterling,Ill.(1) N15 ....7.65
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....7.65
Waukegan,Ill. A7 .....7.65
Worcester,Mass. A7 .....7.95

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4 .....*12.65*
Buffalo W12 .....11.90
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 .....12.65
Minnequa,Colo. C10 ...*12.775*
Monessen Pa. P16 .....11.90
Muncie,Ind. I-7 .....*12.85*
NewHaven Conn. A7...12.95
Palmer,Mass. W12 .....12.20
Pittsburg,Calif. C11 ...*13.45*
Portsmouth,O. P12 ....11 90
Roebling,N.J. R5 .....*12.95*
SparrowsPt.,Md. B2 ..12.75
Struthers O. Y1 .....12.65
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....*9.30*
Alton,Ill. L1 .....*9.50*
Buffalo W12 .....8.70
Cleveland A7 .....9.30
Donora,Pa. A7 .....9.30
Duluth A7 .....9.30
Johnstown,Pa. B2 .....9.30
KansasCity,Mo. S5 .....9.55
LosAngeles B3 .....10.25
Minnequa,Colo. C10 ....9.50
Monessen,Pa. P7, P16 ...*9.30*
NewHaven,Conn. A7 ....9.60
Palmer,Mass. W12 .....9.00
Pittsburg,Calif. C11 ..10.25
Portsmouth,O. P12 ....9.30
Roebling,N.J. R5 .....*9.60*
S.Chicago,Ill. R2 .....9.30
S.SanFrancisco C10 ....10.25
SparrowsPt.,Md. B2 ....9.40
Struthers,O. Y1 .....9.30
Trenton,N.J. A7 .....9.60
Waukegan,Ill. A7 .....9.30
Worcester,Mass. A7 ....9.60

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....*9.30*
Alton,Ill. L1 .....*9.50*
Bartonville,Ill. K4 .....*9.40*
Buffalo W12 .....9.025
Cleveland A7 .....9.30
Donora,Pa. A7 .....9.30
Duluth A7 .....9.30
Fostoria,O. S1 .....*9.345*
Johnstown,Pa. B2 .....9.30
KansasCity,Mo. S5 .....*9.55*
LosAngeles B3 .....10.25
Milbury,Mass.(12) N6..9.325
Minnequa,Colo. C10 ...9.55
Monessen,Pa. P7, P16 ...*9.30*
Muncie,Ind. I-7 .....*9.50*
Palmer,Mass. W12 .....9.325
Pittsburg,Calif. C11 ..10.25
Portsmouth, O. P12 ....9.30
Roebling,N.J. R5 .....*9.60*
S.SanFrancisco C10 ....10.25
SparrowsPt.,Md. B2 ....9.40
Struthers,O. Y1 .....9.30
Trenton,N.J. A7 .....9.60
Waukegan,Ill. A7 .....9.30
Worcester,Mass. A7 ....9.60

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....*15.80*
Bartonville,Ill. K4 .....*15.70*
Buffalo W12 .....14.45
Chicago W13 .....15.60
Cleveland A7 .....15.60
Crawfordsville,Ind. M8.14.25
Fostoria,O. S1 .....*15.60*
Houston S5 .....*15.85*
Jacksonville,Fla. M8 ...14.50
Johnstown,Pa. B2 .....15 60
KansasCity,Mo. S5 .....*15.85*
Kokomo,Ind. C16 .....14.45
Minnequa,Colo. C10 ...*15.85*
Monessen,Pa. P7 .....*15.60*
Muncie,Ind. I-7 .....*15.80*
Palmer,Mass. W12 ....14.75
Roebling,N.J. C10 ....14.45
S.SanFrancisco C10 ....*16.45*
Waukegan,Ill. A7 .....15.60
Worcester Mass. A7, T6.15.90

ROPE WIRE

Bartonville,Ill. K4 .....*12.75*
Buffalo W12 .....12.00
Fostoria,O. S1 .....*12.75*
Johnstown,Pa. B2 .....*12.75*
Monessen,Pa. P7 .....12.00
Muncie,Ind. I-7 .....*12.95*
Palmer,Mass. W12 ....12.30
Portsmouth,O. P12 ....12 75
Roebling,N.J. R5 .....*13.05*
SparrowsPt.,Md. B2 ..12.85
Struthers,O. Y1 .....12.75
Worcester,Mass. J4 ....12.30
(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE

WIRE, Tire Bead
Bartonville,Ill. K4 ..... *16.55*
Monessen,Pa. P16 ..... 15.45
Roebling,N.J. R5 ..... *17.05*

WIRE, Cold-Rolled Flat
Anderson,Ind. G6 ..... *11.65*
Baltimore T6 ..... 11.95
Boston T6 ..... 11.95
Buffalo W12 ..... 10.75
Chicago W13 ..... 11.75
Cleveland A7 ..... 11.65
Crawfordsville,Ind. M8 .. 10.75
Dover,O. G6 ..... *11.65*
Fostoria,O. S1 ..... 11.05
FranklinPark,Ill. T6 .. 11.75
Kokomo,Ind. C16 ..... 10.75
Massillon,O. R8 ..... *11.65*
Milwaukee C23 ..... 10.95
Monessen,Pa. P7, P16 .. *11.65*
NewKensington,Pa. A6 .. 10.75
Palmer,Mass. W12 ..... 11.05
Pawtucket,R.I. N8 ..... *11.95*
Riverdale,Ill. A1 ..... 11.75
Rome,N.Y. R6 ..... *11.65*
Sharon,Pa. S3 ..... *11.65*
Trenton,N.J. R5 ..... *11.95*
Warren,O. B9 ..... *11.65*
Worcester,Mass. A7, T6 .. 11.95

NAILS, Stock	Col.
AlabamaCity,Ala. R2	...173
Aliquippa,Pa. J5	...*173*
Atlanta A11	...175
Bartonville,Ill. K4	...*175*
Chicago W13	...173
Cleveland A9	...173
Crawfordsville,Ind. M8	..166
Donora,Pa. A7	...173
Duluth A7	...173
Houston,Tex. S5	...178
Fairfield,Ala. T2	...173
Jacksonville,Fla.(20) M8	.175
Joliet,Ill. A7	...173
Johnstown,Pa. B2	...173
KansasCity,Mo. S5	...178
Kokomo,Ind. C16	...175
Minnequa,Colo. C10	...178
Monessen,Pa. P7	...*173*
Pittsburg,Calif. C11	...192
Rankin,Pa. A7	...173
S.Chicago,Ill. R2	...173
SparrowsPt.,Md. B2	...175
Sterling,Ill.(7) N15	...175
Worcester,Mass. A7	...179
(To Wholesalers; per cwt)	
Galveston,Tex. D7	...$8.95

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	..$9.80
Wheeling,W.Va. W10	..9.80

POLISHED STAPLES	Col.
AlabamaCity,Ala. R2	...175
Aliquippa,Pa. J5	...*175*
Atlanta A11	...177
Bartonville,Ill. K4	...*177*
Donora,Pa. A7	...175
Duluth A7	...175
Fairfield,Ala. T2	...175
Joliet,Ill. A7	...175
Johnstown,Pa. B2	...175
Kokomo,Ind. C16	...175
Minnequa,Colo. C10	...180
Pittsburg,Calif. C11	...*194*
Rankin,Pa. A7	...175
S.Chicago,Ill. R2	...175
SparrowsPt.,Md. B2	...177
Sterling(7) N15	...175
Worcester,Mass. A7	...181

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2.	$10.26
Atlanta A11	...10.08
Bartonville,Ill. K4	...*10.36*
Buffalo W12	...9.82
Chicago W13	...10.26
Crawfordsville,Ind. M8	..9.63
Donora,Pa. A7	...10.26
Duluth A7	...10.26
Fairfield,Ala. T2	...10.26
Houston S5	...10.51
Jacksonville,Fla. M8	..10.09
Johnstown,Pa. B2	...10.26
Joliet,Ill. A7	...10.26
KansasCity,Mo. S5	...10.51
Kokomo,Ind. C16	...10.36
LosAngeles B3	...11.05
Minnequa,Colo. C10	..10.51
Pittsburg,Calif. C11	..11.04
S.Chicago,Ill. R2	...10.26
S.SanFrancisco C10	..11.04
SparrowsPt.,Md. B2	..10.36
Sterling,Ill.(37) N15	..10.36
Coil No. 6500 Stand.	
AlabamaCity,Ala. R2.	.$10.60
Atlanta A11	...10.40
Bartonville,Ill. K4	...*10.70*
Buffalo W12	...10.15
Chicago W13	...10.60
Crawfordsville,Ind. M8.	.9.95
Donora,Pa. A7	...10.60
Duluth A7	...10.60
Fairfield,Ala. T2	...10.60
Houston S5	...10.60
Jacksonville,Fla. M8	..10.41
Johnstown,Pa. B2	...10.60
Joliet,Ill. A7	...10.60
KansasCity,Mo. S5	...10.85
Kokomo,Ind. C16	...10.70
Los Angeles B3	...10.85
Minnequa,Colo. C10	...10.85
Pittsburg,Calif. C11	...11.40
S.Chicago,Ill. R2	...10.60
S.SanFrancisco C10	...11.40
SparrowsPt.,Md. B2	...10.70
Sterling,Ill.(37) N15	..10.70
Coil No. 6500 Interim	
AlabamaCity,Ala. R2.	.$10.65
Atlanta A11	...10.45
Bartonville,Ill. K4	...*10.75*
Buffalo W12	...10.20
Chicago W13	...10.65
Crawfordsville,Ind. M8.	10.00
Donora,Pa. A7	...10.65
Duluth A7	...10.65
Fairfield,Ala. T2	...10.65
Houston S5	...10.90
Jacksonville,Fla. M8	..10.46
Johnstown,Pa. B2	...10.65
Joliet,Ill. A7	...10.65
KansasCity,Mo. S5	...10.90
Kokomo,Ind. C16	...10.75
LosAngeles B3	...11.45
Minnequa,Colo. C10	...10.90
Pittsburg,Calif. C11	...11.45
S.Chicago,Ill. R2	...10.65
S.SanFrancisco C10	...11.45
SparrowsPt.,Md. B2	...10.75
Sterling,Ill.(37) N15	..10.75

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	...212
Atlanta A11	...208
Bartonville,Ill. K4	...*214*
Crawfordsville,Ind. M8	..192
Donora,Pa. A7	...212
Duluth A7	...212
Fairfield,Ala. T2	...212
Houston S5	...217
Jacksonville,Fla. M8	...197
Joliet,Ill. A7	...212
KansasCity,Mo. S5	...217
Kokomo,Ind. C16	...214
Minnequa,Colo. C10	...217
Pittsburg,Calif. C11	...236
S.SanFrancisco C10	...236
Sterling,Ill.(7) N15	...214
SparrowsPt.,Md. B2	...214
Tonawanda,N.Y. B12	...169
Williamsport,Pa. S19	...175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2.	.172
Duluth A7	...172
Franklin,Pa. F5	...172
Huntington,W.Va. W7	..169
Johnstown,Pa. B2	...*172*
Marion,O. P11	...167
Minnequa,Colo. C10	...177
Sterling,Ill.(1) N15	...172
Tonawanda,N.Y. B12	...*174*

WIRE, Barbed	Col.
AlabamaCity,Ala. R2	.193••
Aliquippa,Pa. J5	...*190§*
Atlanta A11	...199•
Bartonville,Ill. K4	...*198*
Crawfordsville,Ind. M8	..190
Donora,Pa. A7	...193†
Duluth A7	...193†
Fairfield,Ala. T2	...193†
Houston,Tex. S5	...198••
Jacksonville,Fla. M8	...195
Johnstown,Pa. B2	...196§
Joliet,Ill. A7	...193†
KansasCity,Mo. S5	...198••
Kokomo,Ind. C16	...195†
Minnequa,Colo. C10	...198••
Monessen,Pa. P7	...*196•*
Pittsburg,Calif. C11	...213†
Rankin,Pa. A7	...193†
S.Chicago,Ill. R2	...193••
S.SanFrancisco C10	...*213••*
SparrowsPoint,Md. B2	..198§
Sterling,Ill.(7) N15	...198§

WOVEN FENCE, 9-15 Ga.	Col.
Ala.City,Ala. R2	...187••
Aliq'ppa,Pa. 9-14½ga.J2	*190§*
Atlanta A11	...193•
Bartonville,Ill. K4	...*192*
Crawfordsville,Ind. M8	..182
Donora,Pa. A7	...187†
Duluth A7	...187†
Fairfield,Ala. T2	...187†
Houston,Tex. S5	...192••
Jacksonville,Fla. M8	...187
Johnstown,Pa.(43) B2	..190§
Joliet,Ill. A7	...187†
KansasCity,Mo. S5	...192••
Kokomo,Ind. C16	...189†
Minnequa,Colo. C10	...192••
Monessen,Pa. 9 ga. P7	..180•
Pittsburg,Calif. C11	...210†
Rankin,Pa. A7	...187†
S.Chicago,Ill. R2	...187••
Sterling,Ill.(7) N15	....192§

WIRE (16 gage)	An'ld Galv. Stone	Stone
Ala.City,Ala.R2	17.15	18.70••
Aliq'ppa,Pa.	J5.15.70	17.50
Bartonville,Ill. K4	*..17.25*	*19.05*
Cleveland A7	..17.15	....
Crawf'dsville,Ind. M8	15.80	17.75
Fostoria,O. S1	*..17.65*	*19.20†*
Houston S5	*...17.40*	*18.95••*
Jacksonville M8.	16.05	18.00
Johnstown B2	..17.15	18.95§
Kan.City,Mo. S5	*17.40*	....
Kokomo C16	...17.25	19.05†
Minnequa C10	*17.40*	*18.95••*
P'lm'r,Mass.W12	16.30	17.85†
Pitts.,Calif. C11	*17.50*	*19.05†*
SparrowsPt.	B2.17.25	19.05§
Sterling(37) N15	17.25	19.05§
Waukegan A7	..17.15	18.70†
Worcester A7	..17.45	....

WIRE, Merchant Quality (6 to 8 gage)	An'ld Galv.
Ala.City,Ala.	R2.8.65 9.20••
Aliquippa J5	*8.65 9.325§*
Atlanta(48)	A11 ..8.50 9.10•
Bartonville(48)K4	*8.75 9.425*
Buffalo W12	.....8.20 8.75†
Cleveland A7	.....8.65 ....
Crawfordsville	M8.8.05 8.65
Donora,Pa.	A7 ..8.65 9.20†
Duluth A7	.....8.65 9.20†
Fairfield T2	.....8.65 9.20†
Houston(48)	S5 ..8.90 9.45••
Jacks'ville,Fla.	M8.8.30 8.90
Johnstown B2(48)	.8.65 9.325§
Joliet,Ill.	A7 ....8.65 9.20†
Kans.City(48)	S5.8.90 9.45••
Kokomo C16	.....8.75 9.30†
LosAngeles B3	..9.60 10.25§
Minnequa C10	...8.90 9.45••
Monessen P7(48)	*8.65 9.25•*
Palmer,Mass.	W12 8.50 9.05†
Pitts.,Calif.	C11..9.60 10.15†
Rankin,Pa	A7 ...8.65 9.20†
S.Chicago	R2 ...8.65 9.20••
S.SanFran.	C10.9.60 10.15••
Spar'wsPt.	B2(48) 8.75 9.425§
Sterling(48)	N15..8.90 9.575§
Sterling(1)(48)	..8.80 9.475§
Struth'rs,O.(48)	Y1 8.65 9.30‡
Worcester,Mass.	A7 8.95 9.50†

Based on zinc price of: •13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ••Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)
½ in. and smaller:
6 in. and shorter.... 52.5
Longer than 6 in. .. 43.5
⅝ in. thru 1 in.:
6 in. and shorter.... 43.5
Longer than 6 in. .. 41.5
1¼ in. and larger:
All lengths 41.5
Undersized Body (rolled thread)
½ in. and smaller:
6 in. and shorter... 52.5

Carriage, Machine, Lag Bolts
Hot Galvanized:
½ in. and smaller:
6 in. and shorter... 32.0
Longer than 6 in. .. 19.0
⅝ in. thru 1 in.:
6 in. and shorter... 16.0
Longer than 6 in. .. 16.0
1¼ in. and larger:
All lengths 16.0

Lag Bolts
All diameters:
6 in. and shorter... 52.5
Longer than 6 in. .. 44.5

Plow and Tap Bolts
½ in. and smaller by 6 in. and shorter 52.0
Larger than ½ in. or longer than 6 in. .. 44.5

Blank Bolts 44.5
Step, Elevator, Tire Bolts 52.0

Stove Bolts, Slotted
⅛ to ¼-in. incl.:
3 in. and shorter.. 54.00
⅝ to ½-in., inclusive 54.00

NUTS

Reg. & Heavy Square Nuts:
All sizes 58.0

Square Nuts, Reg. & Heavy, Hot Galvanized:
All sizes 44.0

Hex Nuts, Reg. &
Heavy, Hot Pressed:
¼ in. and smaller.. 61.5
⅜ in. to 1 in., incl. 57.5
1⅛ in. to 1½ in., incl. 62.5
1⅝ in. and larger.. 56.0

Hex Nuts, Reg. &
Heavy, Cold Punched:
¼ in. and smaller.. 61.5
⅜ in. to 1½ in., incl. 57.5
1⅝ in. and larger.. 56.0

Hex Nuts, All Types, Hot Galvanized:
¼ in. and smaller.. 48.0
⅜ in. to 1 in., incl.. 44.0
1⅛ in. to 1½ in., incl. 49.0

Hex Nuts, Semifinished, Heavy (Incl. Slotted):
¼ in. and smaller.. 61.5
⅜ in. to 1½ in., incl. 57.5
1⅝ in. and larger.. 56.0

Hex Nuts, Finished (Incl. Slotted and Castellated):
1 in. and smaller... 64.00
1⅛ in. to 1⅜ in., incl. 60.5
1⅝ in. and larger.. 56.0

Semifinished Hex Nuts, Reg. (Including Slotted):
¼ in. and smaller.. 61.5
⅜ in. to 1-in., incl. 64.0
1⅛ in. to 1⅜ in., incl. 60.5
1⅝ in. and larger.. 56.0

CAP AND SETSCREWS
(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Capscrews, Coarse or Fine Thread, Bright:
6 in. and shorter:
¼ in. and smaller... 44.0
⅜, ⅞ and 1 in. diam. 27.0
Longer than 6 in.:
⅜ in. and smaller.. 14.0
⅜, ⅞ and 1 in. diam. 6.5

High Carbon, Heat Treated:
6 in. and shorter:
⅜ in. and smaller.. 31.0
⅜, ⅞ and 1 in. diam. 9.0
Longer than 6 in.:
⅜ in. and smaller.. +6
⅜, ⅞ and 1 in. diam. ..... +24

Flat Head Capscrews:
¼ in. and smaller.. +55.0

Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam.:
6 in. and shorter... 11
Longer than 6 in. .. +10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 12.25
⅞-in. under List less 19%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft. mill; minimum wall thickness, cut lengths 10 to 24 ft. inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	25.98	23.54
1¼	13	....	30.78	28.36
1½	13	29.03	34.01	25.83
1¾	13	34.29	40.18	30.51
2	13	38.44	45.06	34.20
2¼	13	43.29	50.75	38.52
2¼	12	46.99	55.06	41.81
2½	12	51.76	60.65	46.05
2¾	12	56.04	65.67	49.88
3	12	59.76	70.03	53.19

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Standard All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.525	5.425	....	6.50
Ensley,Ala. T2	5.525	5.425	....	6.50
Fairfield,Ala. T2	....	....	....	6.50
Huntington,W.Va. C15	....	....	....	6.50
Gary,Ind. U5	5.525	5.425	....	...
IndianaHarbor,Ind. I-2	5.525	5.425	5.475	....
Johnstown,Pa. B2	....	....	...(16)	6.50
Lackawanna,N.Y. B2	5.525	5.425	....	6.50
Minnequa,Colo. C10	5.525	5.425	....	7.00
Steelton,Pa. B2	5.525	5.425	....	....
Williamsport,Pa. S19	....	....	....	*6.50*

TIE PLATES

Fairfield,Ala. T2	.....6.60
Gary,Ind. U5	.....6.60
Ind.Harbor.Ind. I-2	....6.60
Lackawanna,N.Y. B2	..6.60
Minnequa,Colo. C10	....6.60
Seattle B3	.....6.75
Steelton,Pa. B2	.....6.60
Torrance,Calif. C11	....6.75

JOINT BARS

Bessemer,Pa. U5	.....6.975
Fairfield,Ala. T2	.....6.975
Ind.Harbor.Ind. I-2	...6.975
Joliet,Ill. U5	.....6.975
Lackawanna,N.Y. B2	..6.975
Minnequa,Colo. C10	...6.975
Steelton,Pa. B2	.....6.975

AXLES

Ind.Harbor.Ind. S13	...8.775
Johnstown,Pa. B2	.....8.775

TRACK BOLTS, Untreated

Cleveland R2	.....14.75
KansasCity,Mo. S5	....*14.75*
Lebanon,Pa. B2	....*14.75*
Minnequa,Colo. C10	....*14.75*
Pittsburgh P14	.....13.10
Seattle B3	.....*15.25*

SCREW SPIKES

Lebanon,Pa. B2	.....*14.50*
Pittsburgh P14	.....12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	.....9.75
Ind.Harbor.Ind. I-2, Y1	.9.75
KansasCity,Mo. S5	....9.75
Lebanon,Pa. B2	.....9.75
Minnequa,Colo. C10	....9.75
Pittsburgh J5	.....*9.75*
Seattle B3	.....10.25
S.Chicago,Ill. R2	.....9.75
Struthers,O. Y1	.....9.75
Youngstown R2	.....9.75

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in; 6.25c; 1 15/16 to 3 in., inclusive, 6.40c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga & heavier.
(14) Gage 0.143 to 0.349 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅛" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.15c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 6.045c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.50c.
(31) Widths over ⅝-in.; 7.60c, for widths ⅝-in and under by 0.125 in and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.35c higher.
(41) 9 10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld in mill zone or within switching limits, 6.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(45) Galvanized
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 8.65c, over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	*+9.25*	*+24.5*	*+2.75*	*+19.5*	*+0.25*	*+17*	*1.25*	*+15.5*	*1.25*	*+15.5*	*1*	*+15.75*	*3.5*	*+13.25*
Ambridge, Pa. N2	*+9.25*		*+2.75*		*+0.25*		*1.25*		*1.25*		*1*		*3.5*	
Lorain, O. N3	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Youngstown Y1	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	*5.25*	*+10*	*8.25*	*+6*	*11.75*	*+1.5*	*14.25*	*+0.75*
Alton, Ill. L1	....	....	....	....	....	....	*3.25*	*+12*	*6.25*	*+8*	*9.75*	*+3.5*	*12.25*	*+2.75*
Benwood, W. Va. W10	*4.5*	*+22*	*+7.5*	*+31*	*+18*	*+39.5*	5.25	+10	8.25	+6	11.75	+15	14.25	+0.71
Butler, Pa. F6	*5.5*	*+21*	*+6.5*	*+30*	*+17*	*+38.5*	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	*5.25*	*+10*	*8.25*	*+6*	*11.75*	*+1.5*	*14.25*	*+0.75*
Fairless, Pa. N3	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Fontana, Calif. K1	....	....	....	....	....	....	+8.25	+23.5	+5.25	+19.5	+1.75	+15	0.75	+14.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	4.25	+11	7.25	+7	10.75	+2.5	13.25	+3.25
Lorain, O. N3	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sharon, Pa. S4	*5.5*	*+21*	*+6.5*	*+30*	*+17*	*+38.5*	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	*5.25*	*+10*	*8.25*	*+6*	*11.75*	*+1.5*	*14.25*	*+0.75*
Sparrows Pt., Md. B2	5.5	+21	+0.5	+28.5	+14.5	+36	7.25	+8	10.25	+4	13.75	0.5	16.25	1.25
Wheatland, Pa. W9	7.75	+19	+3	+26.5	+12.5	+34	9.25	+6	12.25	+2	15.75	2.5	18.25	3.25
Youngstown R2, Y1	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	*14.75*	*0.25*	*15.25*	*0.75*	*16.75*	*0.5*	*16.75*	*0.5*	....	....	....	....
Alton, Ill. L1	*12.75*	*+1.75*	*13.25*	*+1.25*	*14.75*	*+1.5*	*14.75*	*+1.5*	....	....	....	....
Benwood, W. Va. W10	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Etna, Pa. N2	*14.75*	*0.25*	*15.25*	*0.75*	*16.75*	*0.5*	*16.75*	*0.5*	*6.25*	*+10.5*	*6.25*	*+10.5*
Fairless, Pa. N3	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Fontana, Calif. K1	*1.25*	*+13.25*	*1.75*	*+12.75*	*3.25*	*+13*	*3.25*	*+13*	*+7.25*	*+24*	*+7.25*	*+24*
Indiana Harbor, Ind. Y1	13.75	+0.75	14.25	+0.25	15.75	+0.5	15.25	+0.5	5.25	+11.5	5.25	+11.5
Lorain, O. N3	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sharon, Pa. M6	*14.75*	*0.25*	*15.25*	*0.75*	*16.75*	*0.5*	*16.75*	*0.5*				
Sparrows Pt., Md. B2	16.75	2.25	17.25	3.75	18.75	2.5	18.75	2.5	8.25	+8.5	8.25	+8.5
Wheatland, Pa. W9	18.75	4.25	19.25	4.75	20.75	4.5	20.75	4.5	10.25	+6.5	10.25	+6.5
Youngstown R2, Y1	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5

*Galvanized pipe discounts based on current price of zinc (10.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.00	27.00	....	36.00	....	42.00	44.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	45.00	49.25	49.25
301	23.25	28.00	....	37.25	42.00	44.25	46.25	51.25	47.50
302	25.25	31.50	38.00	40.50	42.75	45.00	47.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	49.50	57.00	57.00
303	....	32.00	41.00	....	45.75	48.00	....	....	....
304	27.00	33.25	40.50	44.25	45.50	47.75	50.75	55.50	55.50
304L	....	....	48.25	51.50	53.25	55.50	58.50	63.25	63.25
305	28.50	36.75	....	47.50	45.50	47.75	51.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	60.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	71.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	92.75	96.75	96.75
314	....	....	....	....	86.50	....	92.75	....	104.50
316	39.75	49.50	62.25	69.25	69.50	73.00	76.75	81.50	81.50
316L	....	....	70.00	76.50	77.25	80.75	84.50	89.25	89.25
317	48.00	60.00	76.75	88.25	86.25	90.75	93.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	55.50	59.75	65.50	65.50
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	69.75	79.25	79.25
403	....	....	32.00	....	36.00	37.75	40.25	....	48.25
405	19.50	25.50	29.75	36.00	33.75	35.25	37.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.25	33.75	35.00	40.25	40.25
416	....	....	28.75	....	32.75	34.25	....	....	....
420	....	33.50	34.25	41.75	39.25	41.25	45.25	62.00	62.00
430	17.00	21.75	28.75	32.00	32.75	34.25	36.00	40.75	40.75
430F	....	....	29.50	....	33.25	34.75	....	....	....
431	....	28.75	37.75	....	42.00	44.25	46.00	....	....
446	....	....	39.25	59.00	44.25	46.50	47.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Stainless Steel Div., Jones & Laughlin Steel Corp.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

Stainless	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
302	....	....	....	....	37.50
304	34.70	37.95	42.25	46.70	40.00
304L	36.90	40.55	45.10	49.85	....
316	40.35	44.40	49.50	54.50	58.75
316L	45.05	49.35	54.70	60.10	....
316 Cb	47.30	53.80	61.45	69.10	....
321	36.60	40.05	44.60	49.30	47.25
347	38.25	42.40	47.55	52.80	57.00
405	28.60	29.85	33.35	36.85	....
410	28.15	29.55	33.10	36.70	....
430	28.30	29.80	33.55	37.25	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	62.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.00	39.85

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.43-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.170
18.25	4.25	1	4.75	...	2.385
18	4	2	9	...	2.755
18	4	2	....	...	1.845
18	4	1	....	...	1.680
9	3.5	..	....	...	1.275
13.5	4	3	....	...	1.945
13.75	3.75	2	5	...	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
AlamabaCity,Ala. R2	*62.00*	*62.50*	....	....
Birmingham R2	*62.00*	*62.50‡*	....	....
Birmingham U6	....	62.50‡	66.50	....
Woodward,Ala. W15	62.00**	62.50‡	66.50	....
Cincinnati, deld.	....	*70.20*	....	....
Buffalo District				
Buffalo H1	*66.00*	*66.50*	*67.00*	*66.50*
Buffalo R2	64.50	65.00	65.50	66.00
Tonawanda,N.Y. W12	64.50	65.00	65.50	66.00
N.Tonawanda,N.Y. T9	....	65.00	65.50	66.00
Boston, deld.	75.79	76.29	76.79	....
Rochester,N.Y., deld.	67.52	68.02	68.52	....
Syracuse,N.Y., deld.	68.62	69.12	69.62	....
Chicago District				
Chicago I-3	*66.00*	*66.50*	*66.50*	*67.00*
S.Chicago,Ill. R2	64.50	....	65.00	....
S.Chicago,Ill. W14	*66.00*	....	*66.50*	*67.00*
Milwaukee, deld.	*68.46*	*68.96*	*68.96*	*69.46*
Muskegon,Mich., deld.	....	*80.33*	*80.33*	....
Cleveland District				
Cleveland R2, A7	64.50	65.00	65.00	65.50
Akron,O., deld.	67.62	68.12	68.12	68.62
Mid-Atlantic District				
Birdsboro,Pa. B10	66.50	67.00	67.50	68.00
Chester,Pa. P4	66.50	67.00	67.50	....
Swedeland,Pa. A3	*68.00*	*68.50*	*69.00*	*69.50*
New York, deld.	....	*74.70*	*75.20*	....
Newark,N.J., deld.	*72.02*	*72.52*	*73.02*	*73.52*
Philadelphia, deld.	*69.88*	*70.38*	*70.88*	*71.38*
Troy,N.Y. R2	66.50	67.00	67.50	68.00
Pittsburgh District				
NevilleIsland,Pa. P6	*66.00*	*66.50*	*66.50*	*67.00*
Pittsburgh (N&S sides),				
Aliquippa, deld.	....	*67.95*	*67.95*	*68.48*
McKeesRocks,Pa., deld.	....	*67.60*	*67.60*	*68.13*
Lawrenceville, Homestead,				
Wilmerding,Monaca,Pa., deld.	....	*68.26*	*68.26*	*68.79*
Verona,Trafford,Pa., deld.	*68.29*	*68.82*	*68.82*	*69.35*
Brackenridge,Pa., deld.	*68.60*	*69.10*	*69.10*	*69.63*
Midland,Pa. C18	*66.00*	....	....	....

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Youngstown District				
Hubbard,O. Y1	....	....	65.00	....
Sharpsville,Pa. S6	64.50	....	65.00	65.50
Youngstown Y1	....	....	65.00	65.50
Mansfield,O., deld.	69.40	....	69.90	70.40
Duluth I-3	*66.00*	*66.50*	*66.50*	*67.00*
Erie,Pa. I-3	*66.00*	*66.50*	*66.50*	*67.00*
Everett, Mass. E1	66.50	67.00	67.50	....
Fontana,Calif. K1	72.50	73.00	....	....
Geneva,Utah C11	64.50	65.00	....	....
GraniteCity,Ill. G4	66.40	66.90	67.40	....
Ironton,Utah C11	64.50	65.00	....	....
Minnequa,Colo. C10	66.50	67.00	67.50	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,O. I-3	64.50	65.00	65.00	65.50
Cincinnati, deld.	71.04	71.54	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
‡Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.
Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.
Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	77.25
Buffalo H1	78.50

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry, $9 freight allowed K2	103.50
Keokuk,Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	78.50
Troy,N.Y. R2 (Phos. 0.035% max)	72.50
Philadelphia, deld.	80.26
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	69.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	*71.00*

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Houston, Seattle no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds‡	H.R. Alloy 4140††‡		Carbon	Floor
Atlanta	8.17§	9.37§	9.83§	....	8.21	8.45	10.23	....	8.59	8.55	10.51
Baltimore	7.88	8.98	9.76	....	8.36	8.53	9.13[3]	14.68	8.75	8.26	9.76
Birmingham	7.80	9.00	9.52	....	7.82	8.07	10.12	....	8.20	8.16	10.31
Boston	9.26	10.35	11.41	....	9.30	9.63	....	15.19	9.54	9.60	11.08
Buffalo	7.85	9.00	10.68	....	8.05	8.25	8.70	14.50	8.50	8.50	10.05
Chattanooga	7.99	9.24	9.10	....	8.00	8.24	10.04	....	8.44	8.40	10.26
Chicago	7.78	9.00	9.65	53.25	7.82	8.07	8.35	14.15	8.20	8.16	9.49
Cincinnati	7.94	9.05	9.65	50.00	8.14	8.38	8.84	14.46	8.74	8.52	9.78
Cleveland	7.78	8.98	9.55	53.43	7.92	8.16	8.60	14.24	8.57	8.39	9.72
Denver	9.38	11.75	....	....	9.41	9.78	11.10	....	9.82	9.74	11.06
Detroit	8.03	9.25	10.00	59.50	8.17	8.37	8.70	14.41	8.74	8.51	9.74
Erie, Pa.	8.20	9.45	9.95[10]	....	8.50	8.75	9.05[10]	....	9.00	8.85	10.10
Houston	8.80	9.75	10.99	....	7.75	8.05	10.65	15.00	8.00	8.80	10.30
Jackson, Miss.	8.09	9.34	9.79	....	8.16	8.41	10.23	....	8.54	8.50	10.34
Los Angeles	9.10	10.30	11.25	57.45	9.15	9.20	12.10	15.50	9.15	9.65	11.80
Milwaukee	7.93	9.13	9.93	....	7.95	8.20	8.58	14.28	8.41	8.29	9.62
Moline, Ill.	8.13	9.35	10.05	....	8.17	8.42	8.70	....	8.55	8.51	...
New York	8.97	10.23	10.56	....	9.42	9.67	....	15.09	9.45	9.53	10.81
Norfolk, Va.	8.05	...	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.15	9.07	10.24	50.69	8.52	8.71	9.76	15.01	8.70	8.68	9.70
Pittsburgh	8.18	9.45	10.35	50.00	8.33	8.60	9.05	14.15	8.64	8.56	9.88
Portland, Oreg.	9.50	11.20	11.55	57.20	11.35‡‡	9.65	14.50	15.95	9.65	9.30	12.50
Richmond, Va.	8.00	...	10.14	...	8.55	8.40	10.00	...	8.95	8.40	9.90
St. Louis	8.69	9.94	10.56	....	8.74	9.12	9.56	15.60	9.25	9.08	10.40
St. Paul	8.39	9.59	10.26	....	8.43	8.68	9.21	...	8.94	8.90	10.10
San Francisco	9.05	10.40	10.65	53.45	9.05	9.15	12.50	15.60	9.15	9.30	11.85
Seattle	9.95	11.15	12.00	57.20	10.00	10.15	14.05	14.60	9.80	9.70	12.10
Spokane, Wash.	9.55	10.70	11.55	....	9.55	9.50	13.40	16.60	9.35	9.30	11.70
Washington	8.48	9.58	....	....	9.06	9.13	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 10.00c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; §42 in. and under; **⅜-in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle; 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, Portland, Oreg. 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Portland, Oreg., 1000 to 9999 lb; [3]—400 to 9999 lb; [8]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, O., $138; Cutler, Utah, $165.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $150; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $140; Philadelphia, $137; Woodbridge, N.J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96.75; Clearfield, Pa., Portsmouth, O., $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Orviston, Pa., $305.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½-in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝-in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net tons, f.o.b. cars point of entry duty paid, metallurgical grade: European, $33-$34; Mexican, all-rail, duty paid, $25.25-$25.75; barge, Brownsville, Tex., $27.25-$27.75.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old range bessemer	11.85
Old range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom.
Brazilian iron ore, 68-69%	32.00-33.00

Tungsten Ore

Net ton unit, before duty

Foreign wolframite, good commercial quality	20.00-23.00
Domestic, concentrates mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.60-1.70 per long ton unit, c.i.f. U.S. ports, duty for buyer's account: other than Indian, $1.45-1.50; contracts by negotiation.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$55.00-58.00
48% 2.8:1	52.00-55.00
48% no ratio	46.00-48.00

South African Transvaal

48% no ratio	$40.00-41.00
44% no ratio	30.00-31.00

Turkish

48% 3:1	$59.00-62.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.10-3.60
60-65%	3.60-3.80

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: Deld. east of Mississippi river, ocean bags 23,000 lb and over..	10.50
F.o.b. Riverton or Camden, N.J., west of Mississippi river..	9.50
Sponge Iron, domestic, 98 + % Fe: Deld. east of Mississippi river, 23,000 lb and over	10.50
F.o.b. Riverton, N.J., west of Mississippi river	9.50
Sponge Iron, Canadian: F.o.b. shipping point	9.50
Electrolytic Iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.00
Annealed, 99.5% Fe..	36.50
Unannealed (99+ % Fe)	36.00
Unannealed (99+ % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)..	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	

Aluminum: Atomized, 500 lb drum, fr'ght allowed	
Carlots	38.20
Ton lots	40.20
Antimony, 500 lb lots.	32.00*
Brass, 5000-lb lots	32.60-39.40†
Bronze, 5000-lb lots	50.20-54.70†
Copper: Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese: Minus 35 mesh ...	64.00
Minus 100 mesh ...	70.00
Minus 200 mesh ...	75.00
Nickel, unannealed ...	$1.15
Nickel-Silver, 5000-lb lots	50.80-55.40†
Phosphor-Copper, 5000-lb lots	62.00
Copper (atomized) 5000-lb lots	44.50-52.00‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304 ..	$1.08
Stainless Steel, 316 ..	$1.44
Tin	14.50*
Zinc, 5000-lb lots	18.00-31.20‡
Tungsten: Melting grade, 99% 60 to 2000 mesh:	Dollars
1000 lb and over ...	3.75
Less than 1000 lb ..	3.90
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam.	Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5½	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

	Price per net ton
Beehive Ovens	
Connellsville, furnace	$14.75-15.75
Connellsville, foundry ...	*18.00-18.50*
Oven Foundry Coke	
Birmingham, ovens	$28.85
Cincinnati, deld.	33.78
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, deld.	32.25
Saginaw, deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, O., ovens	29.00
Cincinnati, deld.	29.27
Kearny, N.J., ovens	29.75
Milwaukee, ovens	30.50
Painesville,O., ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens.	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.24
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.80 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	*$6.53*	*$6.53*	*$6.53*	*$6.76*
Bar Size Angles	6.57	6.52	6.52	6.75
Structural Angles	6.57	6.52	6.52	6.75
I-Beams	6.82	6.77	6.77	7.00
Channels	6.82	6.77	6.77	7.00
Plates (basic bessemer)	*8.25*	*8.25*	*8.25*	*8.55*
Sheets, H.R.	8.55	8.55	8.55	8.85
Sheets, C.R. (drawing quality)	8.95	8.95	8.95	9.35
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	26.62	26.62	26.62	27.77
Barbed Wire (†)	6.95	6.95	6.95	7.40
Merchant Bars	6.95	6.95	6.95	7.30
Hot-Rolled Bands	7.15	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	*6.58*	*6.58*	*6.58*	*6.98*
Wire Rods, O.H. Cold Heading Quality No. 5 ..	*6.92*	*6.92*	*6.92*	*7.32*
Bright Common Wire Nails (‡)	8.38	8.38	8.38	8.58

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Steel Output Off Slightly

Production of ingots and steel for castings totaled 60,586,145 net tons in the first six months of this year, reports the American Iron & Steel Institute. This was the second largest total on record for a half year, being surpassed only by the 62,607,172 tons produced in the first half of 1956.

During June, output was 9,394,000 tons, compared with 9,792,323 in May this year and 9,720,997 in June a year ago.

Second quarter production amounted to 29,001,103 tons, against 31,585,042 in the first quarter of this year and 30,735,158 in the second quarter of 1956.

The steelmaking furnaces operated at an average of 91.5 per cent of capacity in the first six months (based on rated capacity of 133,459,150 tons annually). During June, operations averaged 85.6 per cent; in the second quarter, they averaged 87.2 per cent.

The index of raw steel production (1947-1949 equals 100) was 145.9 during the first half of this year. This compares with 149.9 in the same period of last year. The index for June was 136.5, against 137.6 in May this year and 141.2 in June, 1956. The index for the second quarter was 138.9, against 152.9 in the first quarter this year and 147.2 in the second quarter last year.

May Steel Shipments Slump

Finished steel shipments during May totaled 6,972,091 net tons, reports the American Iron & Steel Institute. This was down about 5 per cent from the 7,349,752 shipped in April, and down about 10 per cent from the 7,764,776 shipped in May a year ago.

The largest steel consuming markets, other than construction, were: Warehouses, 1,313,116 tons; automotive, 1,030,469; rail transportation, 438,834; machinery, industrial equipment and tools, 436,387.

The May movement of line pipe set a monthly record at 329,219 tons. Construction (including maintenance) at 1,175,463 tons also set a monthly record.

Other leading tonnage products in the month were: Steel plates, 917,865; cold-rolled sheets, 894,781; hot-rolled bars (including light shapes), 691,927; hot-rolled sheets, 655,676; heavy structural shapes, 613,043.

Steel Ingot Production—June 1957

Period	—OPENHEARTH— Net tons	Per cent of capacity	—BESSEMER— Net tons	Per cent of capacity	—ELECTRIC— Net tons	Per cent of capacity	—TOTAL— Net tons	Per cent of capacity
1957								
January ..	9,829,691	99.0	294,839	77.1	884,232	86.5	11,008,762	97.1
February .	8,898,671	99.2	277,682	80.4	810,853	87.8	9,987,206	97.6
March	9,442,164	95.1	275,156	71.9	871,754	85.2	10,589,074	93.4
1st Qtr. ..	28,170,526	97.7	847,677	76.3	2,566,839	86.4	31,585,042	96.0
April	8,820,328	91.8	231,731	62.6	762,721	77.1	9,814,780	89.5
*May	8,842,707	89.1	201,864	52.8	747,752	73.1	9,792,323	86.4
†June	8,496,000	88.4	211,000	57.0	687,000	69.4	9,394,000	85.6
†2nd Qtr. .	26,159,035	89.7	644,595	57.4	2,197,473	73.2	29,001,103	87.2
†1st 6 Mo..	54,329,561	93.7	1,492,272	66.8	4,764,312	79.8	60,586,145	91.5
1956								
January ..	9,676,151	101.4	323,235	79.5	828,845	86.7	10,828,231	99.3
February .	9,043,064	101.3	296,543	78.0	799,388	87.1	10,118,995	99.2
March	9,795,263	102.7	310,060	76.3	819,465	85.7	10,924,788	100.2
1st Qtr. ..	28,514,478	101.8	929,838	77.9	2,427,698	86.5	31,872,014	99.6
April	9,437,945	102.2	306,388	77.9	779,452	84.2	10,523,785	99.7
May	9,370,167	98.2	297,990	73.3	822,219	86.0	10,490,376	96.2
June	8,665,044	93.9	282,846	71.9	773,546	83.6	9,721,436	92.1
2nd Qtr. ..	27,473,156	98.1	887,224	74.3	2,375,217	84.6	30,735,597	96.0
1st 6 Mo. .	55,987,634	100.0	1,817,062	76.1	4,802,915	85.6	62,607,611	97.8
July	1,330,151	13.9	.....	....	292,012	30.5	1,622,163	14.9
August ...	7,213,274	75.6	189,564	46.6	719,759	75.3	8,122,597	74.5
September..	9,342,796	101.2	286,978	72.9	792,885	85.7	10,422,659	98.8
3rd Qtr. ..	17,886,221	63.2	476,542	39.5	1,804,656	63.6	20,167,419	62.3
9 Mo.	73,873,416	87.6	2,293,604	63.8	6,607,571	78.2	82,774,591	85.9
October ...	9,841,002	103.2	330,101	81.2	877,410	91.8	11,048,513	101.3
November .	9,430,248	102.2	295,827	75.2	829,425	89.6	10,555,500	100.0
December .	9,695,919	101.6	308,465	75.9	833,161	87.1	10,837,545	99.4
4th Qtr. ..	28,967,169	102.3	934,393	77.4	2,539,996	89.5	32,441,558	100.3
2nd 6 Mo..	46,853,390	82.8	1,410,935	58.5	4,344,652	76.5	52,608,977	81.3
Total 1956	102,840,585	91.6	3,227,997	67.4	9,147,567	81.2	115,216,149	89.8

Note—The percentages of capacity operated are calculated on annual capacities as of Jan. 1, 1956, as follows: Open hearth 112,317,040 net tons, bessemer 4,787,060 net tons, electric 11,259,050 net tons, total 128,363,090 net tons.

Note—The percentages of capacity operated are calculated on annual capacities as of Jan. 1, 1957, as follows: Open hearth 116,912,410 net tons, bessemer 4,505,000 net tons, electric 12,041,740 net tons, total 133,459,150 net tons.

*Revised. †Preliminary figures subject to revision.

(*Concluded from page* 144)

will install flat steel rolling equipment for its Stainless Steel Division.

Stainless produced in J&L's recently acquired plant at Detroit (Rotary Electric Steel Co.) will be rolled into sheets at the Louisville works, which includes buildings with an area of about 260,000 sq ft and 140 acres of real estate.

Operation of the plant is expected to begin in the third quarter of next year.

Plates . . .

Plate Prices, Page 146

Fabricators are able to obtain all the light plate they need. Some of the continuous mills now rolling plate expect an upturn in automotive demand for sheets during August and September, so they may not be active in the plate market for long.

Pressure for plates continues strong. Even strip plate is tighter than it has been in recent weeks. This tightening is largely a result of expectations that mills will resume rolling sheets at the expense of plate production.

Sheared plate producers are confident they will have all the tonnage they can handle over the next several months.

Tubular Goods . . .

Tubular Goods Prices, Page 150

Auto makers have begun to make inquiries for mechanical tubing required for 1958 models. A Pittsburgh supplier of welded tubing thinks fourth quarter auto demand will be satisfactory. Specialty tubing requirements have slowed down seasonally. Utilities' needs have been set back a month or so in a few cases, but no order cancellations are noted. Demand should improve in September.

A 1300-mile gas pipeline, involving 550,000 tons of large diameter steel pipe, will be laid from Canada to California. The $330-million project is planned by the Pacific Gas & Electric Co. Subject to formal government clearance in Alberta, Ottawa and the U.S., the system is slated for operation late in 1960.

Originating in Alberta, the line will follow a route west of Calgary and span the Rockies at the

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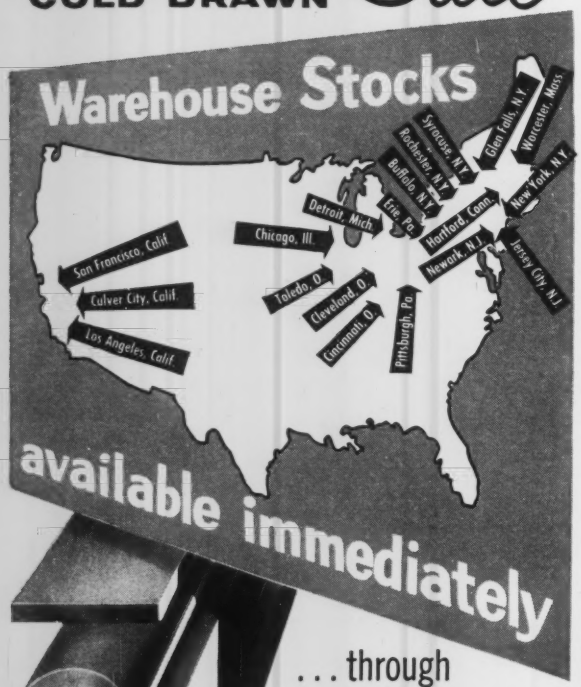

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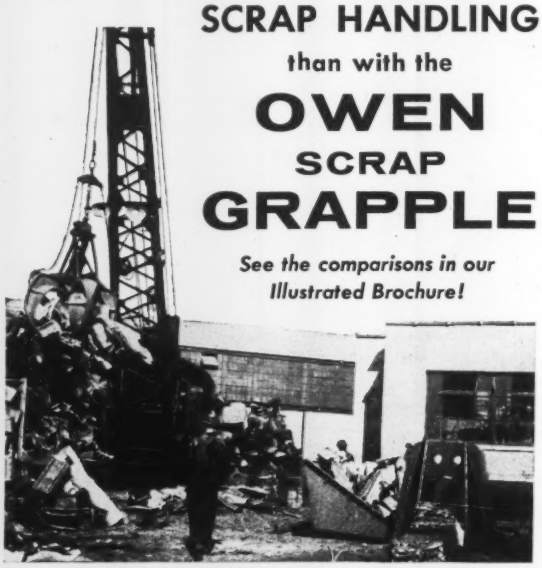

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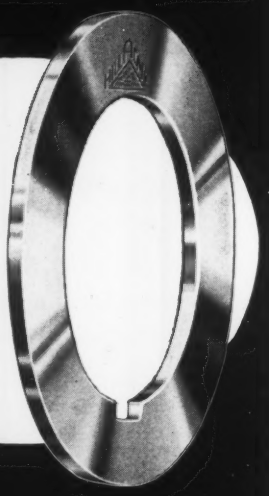

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CLEVELAND KNIFE DIVISION

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Crowsnest Pass. From there it will enter the U.S. in Idaho and will run across Washington, Oregon and northern California, terminating in the San Francisco bay area.

Price increases of $7 a ton on cast iron pressure pipe and $10 a ton on fittings were effected July 15 by U.S. Pipe & Foundry Co., Birmingham. Other cast iron pipemakers are expected to take similar action shortly.

U.S. Pipe raised its pig iron prices $3.50 a ton July 8. Woodward Iron Co., Woodward, Ala., increased its quotations by a like amount July 10.

Warehouse . . .

Warehouse Prices, Page 151

Like mill shipments, warehouse steel sales this month have been better than had been anticipated at many market centers. This is in spite of wide-scale closing down of manufacturing plants for mass vacations.

Warehouse operators anticipate a substantial sales pickup in August and foresee an active fourth quarter.

The only products in tight supply are wide flange beams and heavy plates. Stainless steel sales are holding up well, but demand for cold-finished bars is off sharply. Orders are fairly numerous, but they are smaller than formerly.

Warehouses generally are advancing their prices in line with the recent upward revisions by the mills.

Pig Iron . . .

Pig Iron Prices, Page 151

Leading producers of northern merchant iron advanced their prices $1.50 per ton last week, following the increase of $3.50 a ton on southern pig iron the week preceding.

Demand for merchant iron has been sluggish in recent weeks, partially because of the shutdown of many foundries throughout the country for mass vacations.

Annual pig iron producing capacity in the Philadelphia area will be increased 715,400 net tons shortly. A third blast furnace at the Fairless Works, U.S. Steel Corp., Fairless Hills, Pa., is scheduled to be blown in early next month, adding 626,000 tons; and one of the two furnaces of the Alan Wood Steel Co., Swedeland, Pa., will resume operations around Aug. 1 with increased capacity of 89,400 tons.

Iron Ore . . .

Iron Ore Prices, Page 152

Shipments of Lake Superior iron ore totaled 3,385,426 gross tons in the seven-day period ended July 15, reports the American Iron Ore Association. In the like week a year ago, only 366,154 tons were moved, lake shipping being virtually paralyzed by a strike.

Cumulative shipments to July 15 this year amount to 36,974,035 gross tons. Last year, 33,190,835 tons had been moved in the same period.

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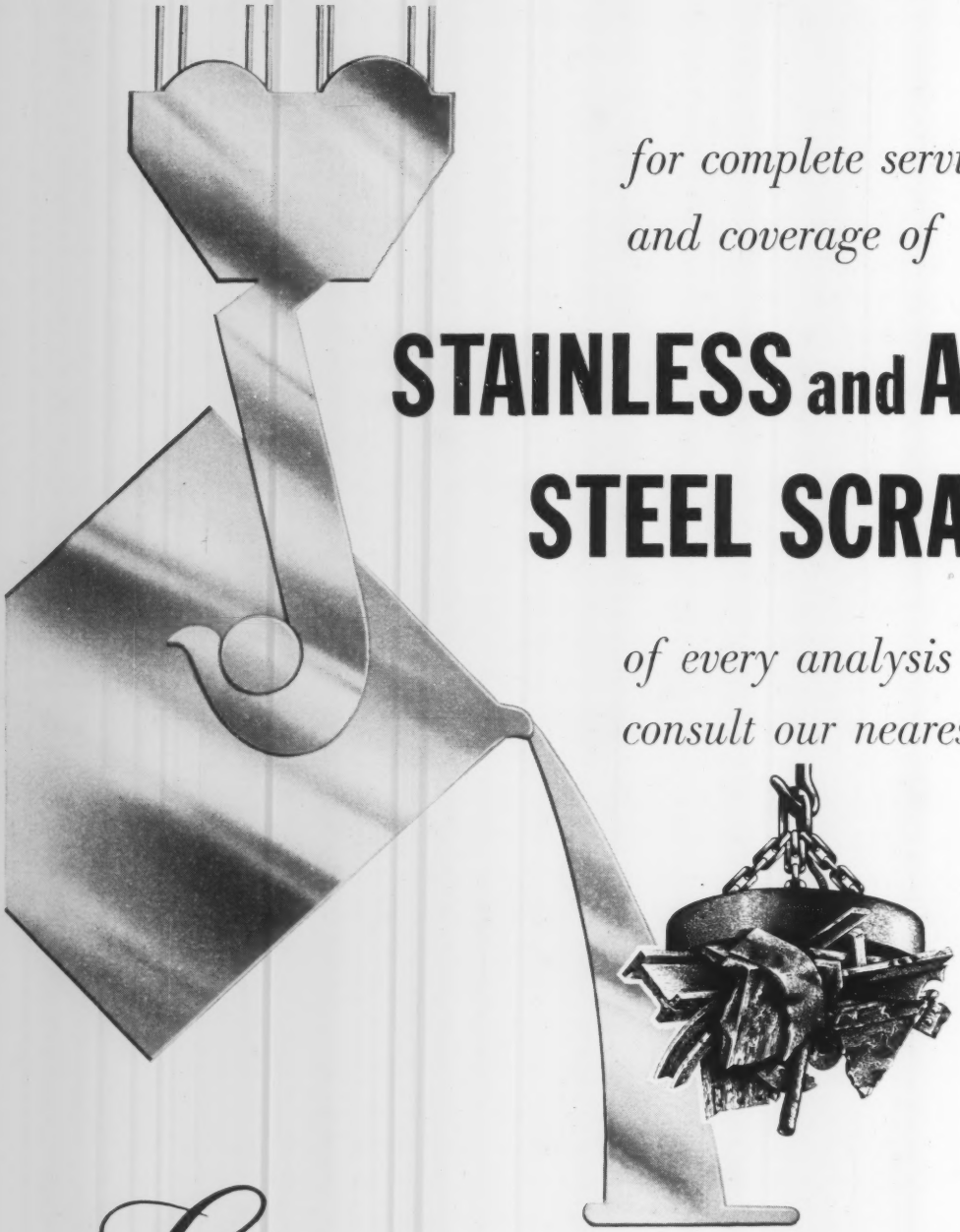

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Scrap Slipping in Dull Market

Prices decline for third straight week at some points, STEEL's composite on the steelmaking grades dropping another 84 cents to $54.33. Late summer pickup in buying is anticipated

Scrap Prices, Page 158

Pittsburgh — Despite a lull in buying, the market remains strong. Recent mill purchases resulted in a slight decrease in the No. 2 heavy melting price. Brokers can buy No. 1 heavy melting for $56. In most other grades, a shortage of good quality scrap gives strength to prices.

Railroad grades continued their advance. No. 1 railroad heavy melting sold for $65, up $1; rails advanced $2 to $3. Cast iron grades are strong. No. 1 machinery being up $1 to $59-$60.

Philadelphia — With trading light, scrap prices have declined. No. 1 heavy melting, No. 1 bundles and No. 1 busheling are holding at $54-$55, delivered. No. 2 heavy melting is off to $47-$48 and No. 2 bundles to $44-$46.

Electric furnace bundles have declined to $57-$58, delivered, and mixed borings and turnings to $37-$38. Short shoveling turnings are easier at $39-$40. Machine shop turnings are $36-$37, heavy turnings $50-$52, and low phos structurals and plate, $59-$60. Other grades, including cast, are unchanged.

New York—The lag in demand for scrap is reflected in a reduction in brokers' buying prices of $1 on most steel items. Brokers are offering $51-$52 for No. 1 heavy melting and No. 1 bundles; $41-$42 for No. 2 heavy melting; and $40-$41 for No. 2 bundles.

Boston—In the absence of domestic buying, steel scrap prices have an easier tone, including those on borings and turnings. Buying for export, dock delivery, has subsided—activity raised prices last month (including tonnage loaded in a Maine port).

Chicago—The scrap market here is holding stable under the influence of light consumer buying. There is firmness noted to the extent that brokers are finding dealer offerings limited. It is more of a problem to acquire tonnage to fill outstanding orders. Brokers must pay higher prices for a few leading grades.

Cleveland — Seasonal sluggishness in scrap demand in this area is intensified by the closing down of some steelmaking facilities to permit repairs and expansion. Some scrap is moving on old contracts, but there is little new buying. Quoted prices are largely nominal. The district ingot rate is 77.5 per cent of capacity, off 1.5 points from a week ago, and the lowest in many months.

Buffalo—The principal local consumer has not placed any orders for scrap this month. Most dealers now think the mill will delay purchases until August. Two other area mills are either out of the market or are buying little.

Detroit—Prices developed on recent auto lists indicated that the market on the No. 1 grades of scrap should move to above $50, but mill resistance has kept prices down, the range holding at $48-$49.

Cincinnati—With no new orders out, scrap prices continue unchanged. Intake at yards has slowed because several large area generators are closed for vacations.

Birmingham—Consumer interest in scrap is practically negligible at present. Only small sales were noted last week. Prices are steady except for rerolling rails which were advanced $4.50 a ton.

St. Louis — The scrap market here remains in the doldrums. Shipments from the country are slow.

Seattle—The scrap market is firm at the higher levels that went into effect two weeks ago. Cast iron, which had been soft, appears stronger. Small lots of No. 1 cupola were sold at $47-$48.

San Francisco—The undertone of the scrap market here is weak. Reasons: Lack of orders has cut exports and many industrial plants in the area have been closed by a machinists' labor dispute.

(*Please turn to page* 163)

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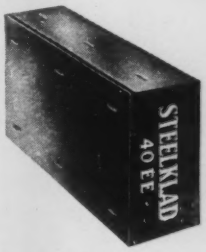
BASIC BRICK



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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, July 17, 1957. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

July 17	$54.33
July 10	55.17
July 1952	42.60
June Avg.	54.89
July 1956	47.70

grade at Pittsburgh, Chicago and eastern Pennsylvania.
Based on No. 1 heavy melting

PITTSBURGH

No. 1 heavy melting	*55.00-56.00*
No. 2 heavy melting	*49.00-50.00*
No. 1 factory bundles	62.00-63.00
No. 1 dealer bundles	56.00-57.00
No. 2 bundles	*47.00-48.00*
No. 1 busheling	56.00-57.00
Machine shop turnings	33.00-34.00
Mixed borings, turnings	33.00-34.00
Short shovel turnings	37.00-38.00
Cast iron borings	37.00-38.00
Cut structurals:	
2 ft and under	63.00-64.00
3 ft lengths	62.00-63.00
Heavy turnings	49.00-50.00
Punchings & plate scrap	62.00-63.00
Electric furnace bundles	62.00-63.00

Cast Iron Grades

No. 1 cupola	49.00-50.00
Heavy breakable cast	*47.00-48.00*
Unstripped motor blocks	36.00-37.00
No. 1 machinery cast	*59.00-60.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*64.00-65.00*
Rails, 2 ft and under	*75.00-76.00*
Rails, 18 in. and under	*76.00-77.00*
Rails, random lengths	*73.00-74.00*
Railroad specialties	*73.00-74.00*

Stainless Steel Scrap

18-8 bundles & solids	300.00-315.00
18-8 turnings	190.00-215.00
430 bundles & solids	*80.00-85.00*
430 turnings	55.00-60.00

CLEVELAND

No. 1 heavy melting	51.00-52.00
No. 2 heavy melting	46.00-47.00
No. 1 factory bundles	55.00-56.00
No. 1 bundles	51.00-52.00
No. 2 bundles	43.00-44.00
No. 1 busheling	51.00-52.00
Machine shop turnings	20.00-21.00
Short shovel turnings	25.00-26.00
Mixed borings, turnings	25.00-26.00
Cast iron borings	25.00-26.00
Cut foundry steel	55.00-56.00
Cut structurals, plates 2 ft and under	63.00-64.00
Low phos. punchings & plate	54.00-55.00
Alloy free, short shovel turnings	28.00-29.00
Electric furnace bundles	54.00-55.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Charging box cast	43.00-44.00
Heavy breakable cast	41.00-42.00
Stove plate	50.00-51.00
Unstripped motor blocks	37.00-38.00
Brake shoes	41.00-42.00
Clean auto cast	54.00-55.00
Burnt cast	39.00-40.00
Drop broken machinery	56.00-57.00

Railroad Scrap

No. 1 R.R. heavy melt.	57.00-58.00
R.R. malleable	61.00-62.00
Rails, 2 ft and under	75.00-76.00
Rails, 18 in. and under	76.00-77.00
Rails, random lengths	68.00-69.00
Cast steel	63.00-64.00
Railroad specialties	65.00-66.00
Uncut tires	63.00-64.00
Angles, splice bars	67.00-68.00
Rails, rerolling	73.00-74.00

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	300.00-310.00
18-8 turnings	200.00-210.00
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00
No. 1 heavy melting	54.00-55.00

No. 2 heavy melting	49.00-50.00
No. 1 bundles	54.00-55.00
No. 2 bundles	46.00-47.00
No. 1 busheling	54.00-55.00
Machine shop turnings	20.00-21.00
Short shovel turnings	26.00-27.00
Cast iron borings	26.00-27.00
Low phos.	59.00-60.00
Electric furnace bundles	59.00-60.00

Railroad Scrap

No. 1 R.R. heavy melt.	63.00-64.00

CHICAGO

No. 1 heavy melt., indus.	54.00-55.00
No. 1 hvy melt., dealer	51.00-52.00
No. 2 heavy melting	44.00-45.00
No. 1 factory bundles	57.00-58.00
No. 1 dealer bundles	53.00-54.00
No. 2 bundles	41.00-42.00
No. 1 busheling, indus.	54.00-55.00
No. 1 busheling, dealer	51.00-52.00
Machine shop turnings	32.00-33.00
Mixed borings, turnings	34.00-35.00
Short shovel turnings	34.00-35.00
Cast iron borings	34.00-35.00
Cut structurals, 3 ft	55.00-56.00
Punchings & plate scrap	56.00-57.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Stove plate	45.00-46.00
Unstripped motor blocks	35.00-36.00
Clean auto cast	51.00-52.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	56.00-57.00
R.R. malleable	62.00-63.00
Rails, 2 ft and under	75.00-76.00
Rails, 18 in. and under	76.00-77.00
Angles, splice bars	67.00-68.00
Rails, rerolling	76.00-77.00

Stainless Steel Scrap

18-8 bundles & solids	*315.00-325.00*
18-8 turnings	*215.00-225.00*
430 bundles & solids	75.00-80.00
430 turnings	55.00-60.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*48.00-49.00*
No. 2 heavy melting	34.00-35.00
No. 1 bundles	*48.00-49.00*
No. 2 bundles	34.00-35.00
No. 1 busheling	*48.00-49.00*
Machine shop turnings	27.00-28.00
Mixed borings, turnings	28.00-29.00
Short shovel turnings	29.00-30.00
Punchings & plate scrap	*59.00-60.00*

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	41.00
Stove plate	42.00
Heavy breakable	38.00
Unstripped motor blocks	28.00
Clean auto cast	50.00
Malleable	52.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	45.50
No. 2 heavy melting	43.00
No. 1 bundles	45.50
No. 2 bundles	38.00
No. 1 busheling	45.50
Machine shop turnings	30.00
Short shovel turnings	32.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	40.00
Heavy breakable cast	40.00
Unstripped motor blocks	40.00
Brake shoes	40.00
Clean auto cast	48.00
Stove plate	*43.00*

Railroad Scrap

No. 1 R.R. heavy melt.	57.00
Rails, 18 in. and under	74.00
Rails, random lengths	*67.00*
Rails, rerolling	*72.00*
Angles, splice bars	62.00

PHILADELPHIA

No. 1 heavy melting	*54.00-55.00*
No. 2 heavy melting	*47.00-48.00*
No. 1 bundles	*54.00-55.00*
No. 2 bundles	*44.00-46.00*
No. 1 busheling	*54.00-55.00*
Electric furnace bundles	*57.00-58.00†*
Mixed borings, turnings	*37.00-38.00†*
Short shovel turnings	*39.00-40.00*
Machine shop turnings	*36.00-37.00*
Heavy turnings	*50.00-52.00*
Structurals & plate	*59.00-60.00*
Couplers, springs, wheels	66.00
Rail crops, 2 ft & under	69.00-71.00

Cast Iron Grades

No. 1 cupola	49.00
Heavy breakable cast	55.00
Malleable	62.00
Drop broken machinery	57.00-58.00

†Nominal

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*51.00-52.00*
No. 2 heavy melting	*41.00-42.00*
No. 1 bundles	*51.00-52.00*
No. 2 bundles	*40.00-41.00*
Machine shop turnings	*26.00-27.00*
Mixed borings, turnings	*27.00-28.00*
Short shovel turnings	*29.00-30.00*
Low phos. (structural & plate)	*54.00-55.00*

Cast Iron Grades

No. 1 cupola	46.00-47.00
Unstripped motor blocks	39.00-40.00
Heavy breakable	46.00-47.00

Stainless Steel

18-8 sheets, clips, solids	280.00-290.00
18-8 borings, turnings	*175.00-185.00*
430 sheets, clips, solids	60.00-70.00
410 sheets, clips, solids	50.00-55.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	36.50-37.50
No. 1 bundles	43.00-44.00
No. 2 bundles	35.00-36.00
No. 1 busheling	42.00-43.00
Machine shop turnings	*24.00-25.00*
Mixed borings, turnings	*27.00-28.00*
Short shovel turnings	*28.00-29.00*
No. 1 cast	34.00-35.00
Mixed cupola cast	33.00-34.00
No. 1 machinery cast	42.00-43.00

BUFFALO

No. 1 heavy melting	46.00-47.00
No. 2 heavy melting	39.00-40.00
No. 1 bundles	46.00-47.00
No. 2 bundles	36.00-37.00
No. 1 busheling	46.00-47.00
Mixed borings, turnings	35.00-36.00
Machine shop turnings	33.00-34.00
Short shovel turnings	36.00-37.00
Cast iron borings	35.00-36.00
Low phos.	53.00-54.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	45.00-46.00
No. 1 machinery	50.00-51.00

Railroad Scrap

Rails, random lengths	61.00-62.00
Rails, 3 ft and under	66.00-67.00
Railroad specialties	59.00-60.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	51.00-52.00
No. 2 heavy melting	44.00-45.00
No. 1 bundles	51.00-52.00
No. 2 bundles	42.00-43.00
No. 1 busheling	51.00-52.00
Machine shop turnings	32.00-33.00
Mixed borings, turnings	30.00-31.00
Short shovel turnings	35.00-36.00
Cast iron borings	30.00-31.00
Low phos. 18 in.	56.00-57.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Heavy breakable cast	42.00-43.00
Charging box cast	42.00-43.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	55.00-56.00
Rails, 18 in. and under	70.00-71.00
Rails, random lengths	62.00-63.00

BIRMINGHAM

No. 1 heavy melting	49.00-50.00
No. 2 heavy melting	39.00-40.00
No. 1 bundles	49.00-50.00
No. 2 bundles	37.00-38.00
No. 1 busheling	49.00-50.00
Cast iron borings	28.00-29.00
Short shovel turnings	38.00-39.00
Machine shop turnings	37.00-38.00
Bar crops and plates	54.00-55.00
Structurals & plate	54.00-55.00
Electric furnace bundles	50.00-51.00
Electric furnace:	
3 ft and under	47.00-48.00
2 ft and under	48.00-49.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	53.00-54.00
Stove plate	53.00-54.00
Unstripped motor blocks	44.00-45.00
Charging box cast	34.00-35.00
No. 1 wheels	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	53.00-54.00
Rails, 18 in. and under	65.00-66.00
Rails, rerolling	*70.00-71.00*
Rails, random lengths	59.00-60.00
Angles, splice bars	59.00-60.00

SEATTLE

No. 1 heavy melting	49.00
No. 2 heavy melting	44.00
No. 1 bundles	44.00
No. 2 bundles	*32.00*
Machine shop turnings	*29.00*
Mixed borings, turnings	*29.00*
Electric furnace No. 1	*55.00*

Cast Iron Grades

No. 1 cupola	45.00
Heavy breakable cast	*37.00*
Unstripped motor blocks	*32.50*
Stove plate (f.o.b. plant)	30.00

LOS ANGELES

No. 1 heavy melting	*46.00*
No. 2 heavy melting	43.00
No. 1 bundles	*45.00*
No. 2 bundles	*38.00*
Machine shop turnings	32.00
Shoveling turnings	34.00
Cast iron borings	32.00
Cut structural and plate, 1 ft and under	*61.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	53.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00

SAN FRANCISCO

No. 1 heavy melting	48.00
No. 2 heavy melting	46.00
No. 1 bundles	47.00
No. 2 bundles	35.00
Machine shop turnings	32.00
Mixed borings, turnings	32.00
Cast iron borings	32.00
Heavy turnings	32.00
Short shovel turnings	34.00
Cut structurals, 3 ft	56.00

Cast Iron Grades

No. 1 cupola	53.00
Charging box cast	45.00-47.00
Stove plate	46.00
Heavy breakable cast	40.00
Unstripped motor blocks	48.00
Clean auto cast	55.00
No. 1 wheels	48.00
Drop broken machinery	53.00

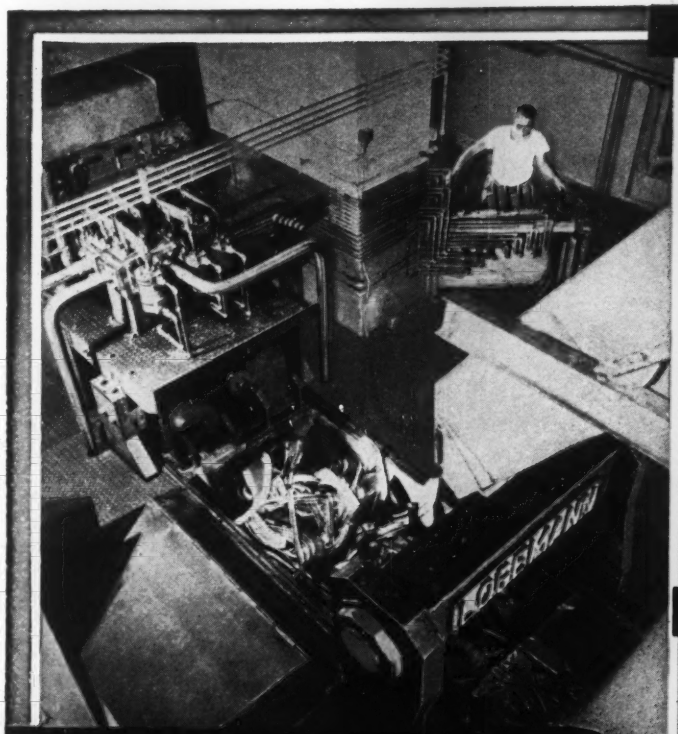
HAMILTON, ONT.

No. 1 heavy melting	43.00
No. 2 heavy melting	38.00
No. 1 bundles	43.00
No. 2 bundles	32.00
Mixed steel scrap	35.00
Mixed borings, turnings	19.00
Busheling, new factory:	
Prepared	43.00
Unprepared	37.00
Short steel turnings	30.00
Rails, rerolling	49.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b. Hamilton, Ont.



LOGEMANN Metal Balers

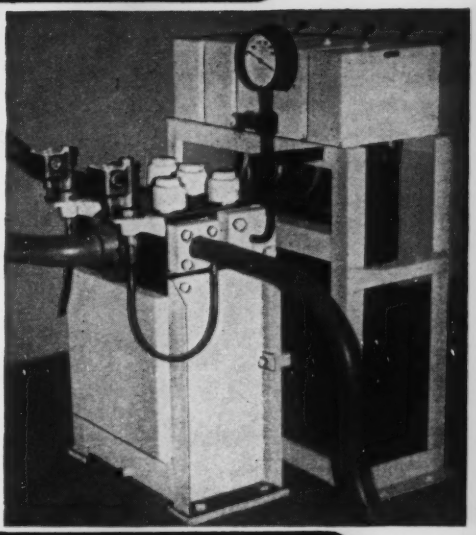
. . . powerful . . . compact . . . capable of high tonnage output!

In the large stamping plants and rolling mills where it is critically important that trim and stamping skeletons are quickly disposed of to avoid interference with production, LOGEMANN metal balers are relied on to keep ahead of production and pack such scrap into high density, self-cohering bricks for re-melting.

Hundreds of installations have established new records for tonnage, minimum maintenance, reliability, over extended periods of uninterrupted operation at high-speed.

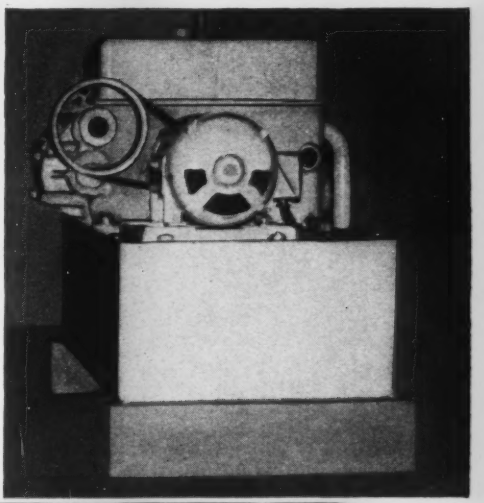
LOGEMANN models are not confined to the large sizes. Many small plants have found it profitable to use smaller sizes embodying the same features of reliability, at minimum operating cost. Interested parties are invited to write for details. Information as to the character of the scrap, tonnage to be handled in a given period of hours, and range of gauges is helpful in determining the proper model.

LOGEMANN



HYDRAULIC VALVES

The illustration shows a close-coupled hydraulic valve, operated by compressed-air cylinders for high-speed distribution of large gallonage of fluid at high pressure. LOGEMANN engineers have designed and built valves for many unusual as well as standard applications, and will welcome inquiries, with an outline of the conditions and requirements.



HYDRAULIC PUMPS

The opposed-cylinder close-coupled double pressure pump shown in the illustration is mounted on an individual tank to conserve floor space under present crowded plant and operating conditions. When requesting details, please indicate the nature of the service, pressure and gallonage requirements, and the fluid to be handled.

LOGEMANN BROTHERS CO.

3126 W. BURLEIGH STREET • MILWAUKEE 10, WISCONSIN

Lead, Zinc Still Dull

Production continues ahead of last year's, but consumption lags. Buyers keep inventories low, knowing they can get immediate delivery. Copper demand stays weak

Nonferrous Metal Prices, Pages 162 & 163

LEAD AND ZINC sales are still at a low ebb, although the chance for further price drops seems to have eased temporarily.

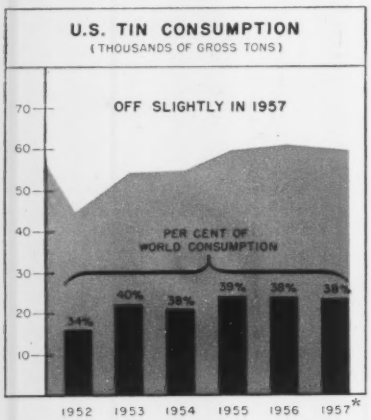
Strengthening the current domestic price for both metals is the comparative stability in the London Metal Exchange bid quotations. The LME zinc quotation is hovering near 9.25 cents a pound, which makes the delivery price in New York 10.75 cents a pound (adding 1.5 cents for duty and ocean freight). Lead is about 11 cents a pound on the LME, bringing the New York delivery price to 13 cents a pound (add 2 cents a pound for duty and freight).

All major producers quote zinc at 10 cents a pound—the price was first announced by a custom smelter on July 1. Lead is holding at 14 cents a pound.

Woes—Zinc producers face two major headaches: 1. Average daily production is over 1956's. 2. Consumption is running well under last year's.

Proof: Smelter production during the first half of 1957 amounted to 562,634 tons, compared with 516,555 tons in the same period last year. Shipments during the first half were 372,449 tons, compared with 443,575 tons in the first half of 1956. Result: Zinc smelter stocks rose 20,762 tons in Jne, to bring the total at the end of the first six months of 1957 to 133,455 tons.

Zinc stocks continue to grow even though over 11,000 tons monthly have been taken off the market since the first of the year through production curtailments. Latest developments: American Steel & Wire Division of U.S. Steel Corp. closed its Donora, Pa., smelter. New Jersey Zinc Co. cut production at its Palmerton, Pa., and Depue, Ill., plants by 2500 tons monthly. American Zinc, Lead & Smelting Co. today (July 22) curtailed production by 1250 tons a month. Affected are facilities at Ft. Smith, Ark., Hillsboro, Ill., Dumas, Tex., and all operations in Wisconsin. The company previously cut production by 1500 tons a month. These cuts should go a long way to stabilizing the present price of zinc.



*Estimated by STEEL.
Source: International Tin Study Group

Another problem: It's rumored that zinc imports are running almost double last year's. Domestic zinc producers declare that imports hurt plenty; the situation's less serious in lead. But don't look for any easing soon.

Reason: Congressional action must be taken before higher import duties can be imposed on foreign origin lead and zinc. Interior Secretary Fred Seaton will testify before a Capitol Hill hearing on Aug. 1-2 on his proposal for a sliding scale of tariffs to protect domestic lead and zinc prices. But it's unlikely that any congressional action will be taken before adjournment.

Bright spot: Producers think orders will pick up in the next six weeks as customers begin buying for the fourth quarter. But as one man said: "This is just wishful thinking. We're hoping lead and zinc will ride along on the coat tails of an across-the-board fourth quarter pickup."

If demand should go up sharply, don't be surprised to see the zinc price rise. Many observers see it happening by year end.

Cutbacks in Copper?

Opinion runs hot and cold on whether Chile will order production curtailments of copper. Most American observers feel Chile will have to initiate such cutbacks to stabilize the price and buoy world demand. However, recent drops in copper quotations on the London Metal Exchange may indicate the LME is banking on no cuts.

Most producers think the present price will hold, though it might be difficult unless production is curtailed. One copper executive made the statement that prices

NONFERROUS PRICE RECORD

	Price July 17	Last Change	Previous Price	June Avg	May Avg	July, 1956 Avg
Aluminum	27.10	Aug. 10, 1956	25.90	27.100	27.100	25.900
Copper	28.50–29.25	July 1, 1957	29.00–29.25	30.250	31.087	40.030
Lead	13.80	June 11, 1957	14.80	14.120	15.185	15.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	33.750
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	64.500
Tin	96.125	July 16, 1957	95.75	98.080	98.341	96.435
Zinc	10.00	July 1, 1957	10.50	10.840	11.923	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

have reached such a low level they are barely sufficient to cover production costs.

Domestic sales are still off, though foreign consumption continues at a good clip. Customer inventories stay at low levels because buyers know they can get immediate deliveries.

Aluminum Men Optimistic

Though sales are still disappointing, producers report an upswing in demand. It seems certain that this year's won't match last year's.

Producers are optimistic about the long pull, though. Example: One maker estimates the average family now uses about 1 1/10-rolls of aluminum foil a year. He expects this figure to reach five rolls a year by 1960.

One thing's certain: Producers will have to increase demand for aluminum if the industry's estimated 1960 capacity of 8 billion lb is to be sold.

The Business & Defense Services Administration reports that 128 million lb of aluminum will be set aside from total supply available in the fourth quarter of 1957 to fill Department of Defense and Atomic Energy Commission orders.

Mag Plants Still Unsold

The General Services Administration rejected the bid of Velasco Magnesium Corp. for the government's magnesium facility at Velasco, Tex., but has not indicated whether it will accept the high bid ($19,370,000) from Dow Chemical Co.

Industry observers believe GSA may have turned Dow's bid over to the Justice department to see if the sale violates any antitrust statute. Since Dow is the only producer of magnesium at the moment, it's believed Justice will have a strong interest in seeing that another producer enters the field, if at all possible.

In another development, GSA rejected the two bids for the $14.7 million electrolytic magnesium smelter at Painesville, O. Probable reason: Both were conditional bids.

TRADE-MARKS WHICH IDENTIFY THE ORIGINAL AND THE BEST

"PHOSPHOR BRONZE."®

Phosphor Bronze ®

ELEPHANT BRAND®

A little more than seventy-five years ago a wonderful new kind of copper and tin alloy possessing high tensile strength, great resiliency and unusual corrosion-resistant properties was introduced to American industry. This new bronze alloy had been perfected by the addition of a small amount of phosphorus to the copper and tin mixture.

No other producer of metals in the United States was able to duplicate this extraordinarily useful alloy. Therefore, because of the uniqueness of this new phosphorus-bearing alloy, the smelters responsible for its creation gave it a trade name "PHOSPHOR BRONZE" and adopted for itself the firm name of The Phosphor Bronze Smelting Company.

This was the first Phosphor Bronze ever produced in the United States of America.

"Phosphor Bronze" was immediately accepted by America's burgeoning industry. Demand for the new alloy grew by leaps and bounds and The Phosphor Bronze Smelting Company soon had many imitations of its products. So, to protect customers from spurious imitations, the trade name of "Phosphor Bronze" was incorporated into two distinctive *trade-marks* which were duly registered in the U. S. Patent Office on February 21, 1888. These trade-mark registrations have been maintained, in full force, throughout the intervening years and are presently owned by The Seymour Manufacturing Company.

In time, new variations of the original "Phosphor Bronze" alloy were introduced by the now-famous smelting Company. To identify these, the trade name of "ELEPHANT BRAND" was adopted, together with a distinctive picture of an elephant. The words "ELEPHANT BRAND" were incorporated into a *trade-mark* and registered with the U. S. Patent Office on August 20, 1907. The picture of the elephant shown in this advertisement, is a new one, designed to supersede its 1906 predecessor and was Registered, as a *trade-mark,* on October 2, 1956.

We are proud that American industry has wholeheartedly accepted our product. The name "PHOSPHOR BRONZE" has become internationally known and is familiar to metalworking men and metallurgists everywhere.

We—the officers, stockholders and employees of The Seymour Manufacturing Company endorse the action of The Phosphor Bronze Corporation in bequeathing this name to the American metalworking industries. We reserve only . . . the exclusive right to use the trademarks illustrated above.

THE SEYMOUR MANUFACTURING COMPANY

Successors to The Phosphor Bronze Corporation

SEYMOUR, CONNECTICUT

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots, 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 241, 30.50; No. 356, 28.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100-lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 29.25 deld. Conn. valley; 29.25 deld. Midwest; custom smelters, 28.50; lake, 29.25 deld.; fire refined, 29.00 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-110 nom. per troy oz.

Lead: Common, 13.80; chemical, 13.90; corroding, 13.90, St. Louis, New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 13 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (die casting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot or ingots for addition to cast iron, 74.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01.

Osmium: $80-100 per troy oz, nom.

Palladium: $23-24 per troy oz.

Platinum: $89-95 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $10.50 per lb, commercial grade.

Silver: Open market, 90.25 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Rod, $58.06 per lb; sheet, $45.36 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N.Y., spot, 96.125; prompt, 96.00.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.25; grade A-2 (0.5% Fe max.), $2.00 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $3.75 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $4.60.

Zinc: Prime Western, 10.00; brass special, 10.25; intermediate, 10.50, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 11.35; special high grade, 11.75 deld. Die casting alloy ingot No. 3, 14.25; No. 2, 15.25; No. 5, 14.75 deld.

Zirconium: Sponge, commercial grade, $5-10 per lb.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.25-29.00; No. 12 foundry alloy (No. 2 grade), 22.25-23.00; 5% silicon alloy, 0.60 Cu max., 25.50-25.75; 13 alloy, 0.60 Cu max., 25.50-25.75; 195 alloy, 25.25-26.25; 108 alloy, 22.75-23.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.00; grade 2, 22.25; grade 3, 21.25; grade 4, 20.25.

Brass Ingot: Red brass, No. 115, 29.50; tin bronze, No. 225, 39.00; No. 245, 33.50; high-leaded tin bronze, No. 305, 33.50; No. 1 yellow, No. 405, 24.00; manganese bronze, No. 421, 27.00.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.80, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.77, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 34.605; l.c.l., 35.23. Weatherproof, 30,000-lb lots, 35.72; l.c.l., 36.47. Magnet wire deld., 15,000 lb or more, 41.93; l.c.l., 42.68.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $19.50 per cwt; pipe, full coils, $19.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $9.50-15.95; sheared mill plate, $8.00-11.50; wire, $7.50-11.50; forging billets, $6.00-7.60; hot-rolled and forged bars, $6.15-7.90.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 20.50; plates, 19.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.00-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.249-0.138	40.90-45.40	...
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	38.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.50-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.30
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. width or diam., 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-Finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
Rolled				
1.125-1.500	55.20	53.90	59.00	56.10
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths, 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick width 0.0750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
3/4	$18.75	2	$ 57.00
1	29.00	4	157.20
1 1/4	39.25	6	281.65
1 1/2	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	43.10-44.60	57.80-61.80
12-14	43.40-44.80	58.40-62.70
15-17	43.60-45.40	59.60-64.30
18-20	44.10-45.80	61.50-66.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Thread plate, .188 in., 71.70; .250-2.00 in., 70.60. Tooling plates, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Aluminum: 1100 clippings, 13.00-13.50; old sheets, 10.00-10.50; borings and turnings, 6.50-

BRASS MILL PRICES

MILL PRODUCTS a — SCRAP ALLOWANCES f

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	51.38b	48.61c	....	51.57	25.250	25.250	24.500
Yellow Brass	44.69	32.87d	45.23	47.60	19.125	18.875	17.375
Low Brass, 80%	47.40	47.34	47.94	50.21	21.375	21.125	20.625
Red Brass, 85%	48.36	48.30	48.90	51.17	22.250	22.000	21.500
Com. Bronze, 90%	49.86	49.80	50.40	52.42	23.125	22.875	22.375
Manganese Bronze	52.52	46.69	57.19	....	17.625	17.375	16.875
Muntz Metal	46.94	42.75	....	....	17.875	17.625	17.125
Naval Brass	48.85	43.16	55.91	52.26	17.625	17.375	16.875
Silicon Bronze	55.96	55.15	56.00	57.97e	24.750	24.500	24.750
Nickel Silver, 10%	61.52	63.85g	63.85	....	25.750	25.000	12.875
Phos. Bronze, A-5%	70.47	70.97	70.97	72.15	26.250	26.000	25.000

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

7.00; crankcases, 10.00-10.50; industrial castings, 10.00-10.50.

Copper and Brass: No. 1 heavy copper and wire, 20.50-21.00; No. 2 heavy copper and wire, 19.00-19.50; light copper, 16.75-17.25; No. 1 composition red brass, 18.50-19.00; No. 1 composition turnings, 18.00-18.50; yellow brass turnings, 10.75-11.25; new brass clippings, 17.00-17.50; light brass, 10.50-11.00; heavy yellow brass, 12.50-13.00; new brass rod ends, 14.50-15.00; auto radiators, unsweated, 13.50-14.00; cocks and faucets, 14.50-15.00; brass pipe, 15.50-16.00.

Lead: Heavy 9.50-10.00; battery plates, 4.25-4.50; linotype and stereotype, 11.50-12.00; electrotype, 10.00-10.50; mixed babbitt, 11.00-11.50.

Monel: Clippings, 45.00-53.00; old sheets, 44.00-53.00; turnings, 35.00-43.00; rods, 45.00-53.00.

Nickel: Sheets and clips, 85.00-90.00; rolled anodes, 85.00-90.00; turnings, 70.00-75.00; rod ends, 85.00-90.00.

Zinc: Old zinc, 3.00-3.25; new die-cast scrap, 2.75-3.00; old die-cast scrap, 1.50-1.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 17.00-18.00; 3003 clippings, 17.00-18.00; 6151 clippings, 17.50; 5052 clippings, 17.00-17.50; 2014 clippings, 16.50-17.00; 2017 clippings, 16.50-17.00; 2024 clippings, 16.50-17.00; mixed clippings, 16.00; old sheets, 14.00-14.50; old cast, 14.00-14.50; clean old cable (free of steel), 16.50-17.50; borings and turnings, 14.50-15.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 51.00; light scrap, 46.00; turnings and borings, 31.00.

Copper and Brass: No. 1 heavy copper and wire, 25.00; No. 2 heavy copper and wire, 22.50; light copper, 20.375; refinery brass (60% copper) per dry copper content, 22.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 25.00; No. 2 heavy copper and wire, 22.50; light copper, 20.625; No. 1 composition borings, 21.25; No. 1 composition solids, 21.50; heavy yellow brass solids, 15.50; yellow brass turnings, 14.50; radiators, 16.50.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 47.54; oval, 45.75, 5000-10,000 lb; electrodeposited, 39.50, 2000-5000 lb lots; cast, 41.00, 5000-10,000 quantities.

Nickel: Depolarized, less than 100 lb, 101.50; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab; less than 200 lb, 114.50; 200-499 lb, 113.00; 500-999 lb, 112.50; 1000 lb or more, 112.00.

Zinc: Balls, 17.50; flat tops, 17.50; flats, 19.25; ovals, 18.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb in 100-lb drums.

Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 2000 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30, f.o.b. Detroit.

Copper Cyanide: 100-200 lb, 74.80; 300-900 lb, 72.80.

Copper Sulphate: 100-1900 lb, 15.20; 2000-5900 lb, 13.20; 6000-11,900 lb, 12.95; 12,000-22,900 lb, 12.70; 23,000 lb or more, 12.20.

Nickel Chloride: 100 lb, 48.50; 200 lb, 46.50; 300 lb, 45.50; 400 lb, 43.50; 5000 lb, 41.50; 10,000 lb, 40.50.

Nickel Sulphate: 100 lb, 40.50; 200 lb, 38.50; 300 lb, 37.50; 400-4900 lb, 35.50; 5000-29,900 lb, 33.50; 30,000 lb or more, 32.50.

Sodium Cyanide: 100 lb, 27.50; 200 lb, 25.80; 400 lb, 22.80; 1000 lb, 21.80; f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 76.30; 100-600 lb, 67.20; 700-1900 lb, 64.50; 2000-9900 lb, 62.60; 10,000 lb or more, 61.30.

Stannous Chloride (anhydrous): Less than 25 lb, 165.90; 25 lb, 130.90; 100 lb, 115.90; 400 lb, 113.50; 5200-19,600 lb, 101.30; 20,000 lb or more, 89.10.

Stannous Sulphate: Less than 50 lb, 128.70; 50 lb, 98.70; 100-1900 lb, 96.70; 2000 lb or more, 94.70.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from page* 157)

Los Angeles—A somewhat softer tone is noted in the local market. Dealers attribute the easing to fulfillment of Japanese export contracts and to heavy domestic mill inventories.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

5000 tons, naval hospital, Portsmouth, Va., through Paul Tishman General Contractor Inc., to Lehigh Structural Steel Co., Allentown, Pa.

4000 tons, nine intake gates, anchor bolt assemblies, guides, head sills, etc., Rocky Reach project, to California Steel Products Co., Richmond, Calif., low at $1,992,330, by Chelan county P.U.D. No. 1, Wenatchee, Wash.

1370 tons, state bridge project 103-74, Norwich, Conn., through M. A. Gammino & Brunalli Construction Co., general contractor, to Phoenix Bridge Co., Phoenixville, Pa.

1200 tons, 84 intake trash racks and guides, to Commercial Steel Fabricators Inc., Seattle, low at $405,133, by Chelan county P.U.D. No. 1, Wenatchee, Wash.

525 tons, central building, Museum of Science, Boston, to A. O. Wilson Structural Co., Cambridge, Mass.; Tredennick-Billings Co., Boston, general contractor; 35 tons, reinforcing bars, Bethlehem Steel Co., Bethlehem, Pa.

450 tons, state highway structures, Reading-Woburn-Stoneham, Mass., to the Bethlehem Steel Co., Bethlehem, Pa., through the Consolidated Builders Inc., Attleboro, Mass., and the White Contracting Co., Cambridge, Mass., joint contractors.

425 tons, state highway bridges, Hopkinton-Concord, N.H., to Bancroft & Martin Rolling Mills Co., South Portland, Me.; Frank Palazzi & Sons Inc., Johnston, R.I., general contractor.

392 tons, east and west railway trestles, second crusher, Erie Mining Co., Aurora, Minn., to Bethlehem Steel Co., Bethlehem, Pa.

320 tons, Portland, Oreg., college addition, to A. Young & Sons Inc., Portland, Oreg.

300 tons, boiler supports, Combustion Engineering Corp., Yuma, Ariz., to Maxwell Steel Co.

270 tons, Long Island railroad bridge, Hollis, N. Y., through Horn Contracting Co., general contractor, to the American Bridge Division, U.S. Steel Corp., Pittsburgh.

250 tons, Hills Creek dam bridge, Oregon State, to West Coast Steel Works, Portland, Oreg., by U.S. Engineer, Portland, at $208,100.

100 tons, tailrace gantry crane for Ice Harbor dam, to Moffett Engineering Co., Albany, Calif., low at $111,616 to U.S. Engineer, Walla Walla, Wash.

100 tons, addition, Rhode Island Hospital, Providence, R.I., to Providence Iron & Steel Co., Providence; E. Turgeon Construction Co., Providence, general contractor.

STRUCTURAL STEEL PENDING

20,000 tons estimated, additional deck, George Washington bridge over Hudson river, New York; proposal approved by Port of New York Authority.

450 tons, two welded girder bridges, Reading-Stoneham-Wilmington, Mass.

350 tons, state bridges, Andover, Mass.; bids July 30, Boston.

225 tons, North Junior High School, Brockton, Mass.; taking bids.

204 tons, including reinforcing, Josephine county, Oregon, 180-ft bridge; bids to Grants Pass, July 17; part of material to be furnished by county.

150 tons, King county, Washington, Skykomish river bridge; Dale M. Madden Construction Co., low at $138,257; also 40 tons of reinforcing involved.

150 tons, river crossing power towers, Seattle light system; Don L. Cooney, Seattle, low at $52,628.

145 tons, including bars, state bridge, Colebrook-Norfolk, Conn.

125 tons, including reinforcing, piling also involved, Chilkat river bridge, Alaska; Kell

Metallurgist

Energetic, progressive

STEEL TUBE MANUFACTURER

Offers

A Career With

A Future

in Production Metallurgy including Analysis of Mechanical, Metallurgical and Corrosion Failures—Development Metallurgy — Specifications — Consumer Relations.

Qualifications: B.S. Degree in Metallurgical Engineering or in Chemical Engineering. Age to 30 years.

Salary commensurate with ability. 37½ hours per week. Excellent benefits.

Fine opportunity for advancement.

Send resume to:

PERSONNEL DEPARTMENT

CARPENTER STEEL COMPANY

UNION, NEW JERSEY

INDUSTRIAL ENGINEERS

Our $194 million expansion program which will soon double our steel-making capacity, has created opportunities in industrial engineering for young men trained or experienced in wage incentive programing, methods engineering, and statistical quality control.

2 to 5 years experience desired. Professional status assured. Openings at our Fontana plant in Southern California.

Send complete resume to Employment Manager

KAISER STEEL CORP.

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Fontana, Calif.

CLASSIFIED

DISTRIBUTORSHIPS WANTED

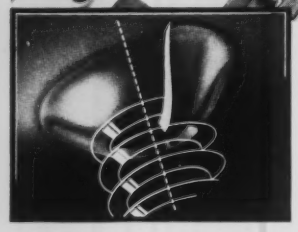
Connecticut concern established 53 years seeking new lines for direct selling to all industrial plants, heating and electrical contractors. Engineering department available if necessary for the sale of product. State if item ever sold in Connecticut and send catalogs, prices, discounts and any other pertinent information to BOX 571, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED RATES

All classifications other than "Positions Wanted" set solid. 50 words or less $15.00, each additional word .30, all capitals, 50 words or less $19.20, each additional word .38; all capitals leaded, 50 words or less $23.40, each additional word .47. "Positions Wanted" set solid, 25 words or less $3.60, each additional word .14; all capitals, 25 words or less $4.50, each additional word .18; all capital leaded, 25 words or less $5.40, each additional word .22. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

SPECIALS?

FASTENERS•CLIPS•CLAMPS•FORMS



Creators of the famous Prestole "impression that lasts"—the strongest geometrical shape, with full 360° grip on the screw.

PRESTOLE can solve the fastening problem that is making any assembly operation slow, complicated, and costly, with a Prestole special-type fastener.

When it comes to development, design, and production "know-how" in the fastener industry, Prestole renders an intelligent, specialized engineering service.

Prestole designs and produces special-type fasteners in an endless variety of formed metal parts. Thousands of assembly problems have been solved by this aggressive, experienced organization of fastening engineers.

So, if your assembly problem calls for thread-engaging fasteners or special forms made of various metals—why not let Prestole solve it?

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PRESTOLE OF CANADA, OAKVILLE, ONTARIO

TELL US MORE ABOUT PRESTOLE DESIGN-ENGINEERING SERVICE FOR SPECIAL/STANDARD FASTENERS.

TO:

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Company_____

Street_____

City_____ Zone____ State_____

We Manufacture:

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& Peterson, Juneau, Alaska, low at $309,325.

122 tons, Rogue river dam project, near Ashland, Oreg.; tunnel supports; bids invited July 15 by the Bureau of Reclamation.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1600 tons, Washington state Narrows bridge, Bremerton, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; general contract to Peter Kiewit Sons Co., Seattle, low at $2,324,834.

1450 tons, state bridge work, University avenue, Philadelphia, through McCloskey & Co., general contractor, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.; also 3900 tons of structurals, same project, to Bethlehem.

750 tons, senior high school, Cheltenham, Pa., to U.S. Steel Supply Division, U.S. Steel Corp., Pittsburgh; also, approximately 500 tons of bar joists and long span joists to Truscon Steel Co., Philadelphia; and 150 tons of shapes to Bethlehem Fabricators, Bethlehem, Pa.

450 tons, addition, Pennsylvania Hospital, Philadelphia, to Taylor-Davis Inc., Philadelphia.

375 tons, building, Rhode Island Hospital, Providence, R.I., to Plantations Steel Co., Providence; E. Turgeon Construction Co. Inc., Providence, general contractor.

360 tons, state road work, route 108, Camden county, New Jersey, through Ole Hansen, general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

320 tons, state highway bridges, Hopkinton-Concord, N.H., to Bancroft & Martin Rolling Mills Co., South Portland, Me.; Frank Palazzi & Sons Inc., Johnston, R.I., general contractor.

300 tons, high school, Willow Grove, Pa., to Concrete Steel Co., Philadelphia.

170 tons, Oregon state Santiam river bridge, to unstated interest.

150 tons, miscellaneous small contracts, to Northwest Steel Rolling Mills Inc., Seattle.

155 tons, Children's Reception Center, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Canadian National, 150 diesel units, with 80 road switchers, 19 yard switchers and 17 passenger units going to General Motors Diesel Ltd., London, Ont., thirty 180-hp road switchers to Montreal Locomotive Works, Montreal, Que., two road switchers to Electro-Motive Division, General Motors Corp., La Grange, Ill., and two yard switchers to Alco Products Inc., New York.

Chicago, Burlington & Quincy, thirty 1750-hp road switchers, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Turkish State Railways, five 1980-hp standard gage diesel units, through Pan American Investment Inc., to General Electric Co., Schenectady, N. Y.

Hindustan Steel Co., India, ten 80-ton, ten 35-ton and four 150-ton broad gage industrial diesel units, to General Electric Co., Schenectady, N. Y.

India Iron & Steel Co., India, three 80-ton and two 35-ton broad gage industrial diesel units, to General Electric Co., Schenectady, N. Y.

RAILROAD CARS PLACED

Pittsburgh & Lake Erie, 2000 hopper cars to Dispatch Shops Inc., East Rochester, N. Y., and 500 mill-type gondola cars, to Greenville Steel Car Co., Greenville, Pa.

Union Pacific, five coaches, to Pullman-Standard Car Mfg. Co., Chicago.

Wabash, one coach, to Pullman-Standard Car Mfg. Co., Chicago.

PIPE . . .

CAST IRON PIPE PENDING

350 tons or more, 3040 ft of 24-in.; bids to Port of Tacoma, Wash., July 24; alternatives for steel pipe.

220 tons, 8 and 6-in.; bids in to Moses Lake, Wash.

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Safety-Engineered for superior service...

U-W GOLD CLIPS

- Designed for rugged duty
- Wide range of sizes from ⅛" to 1¼"
- Conveniently packaged

The Gold Clip, an important addition to Upson-Walton's complete line of highest quality wire rope fittings, is setting a new standard for rugged, dependable service. U-bolt gold-chromate coated after galvanizing, your identification of top quality. All *Gold-Clips* are drop-forged from high grade forging steel.

Available from stock in ⅛" through 1¼" sizes. Convenient packaging simplifies handling. See your nearby Upson-Walton distributor or write for complete details. The Upson-Walton Co., 12545 Elmwood Avenue, Cleveland 11, Ohio.

ENGINEERED FOR SAFETY

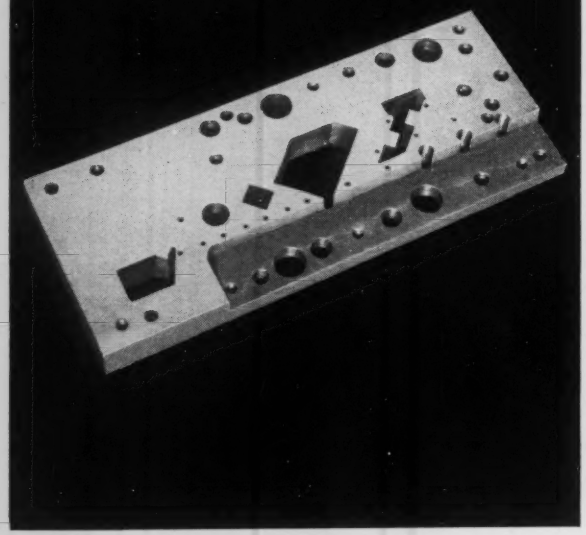
The UPSON-WALTON Company

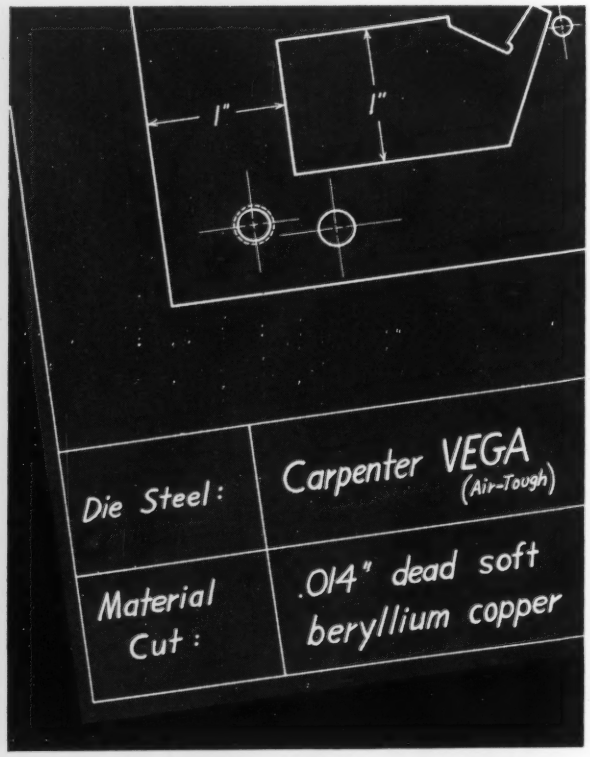
SINCE 1871

Manufacturers of WIRE ROPE • ROPE FITTINGS • TACKLE BLOCKS • CRANE HOOK BLOCKS

Other offices: Chicago • New York • Pittsburgh

FIELD REPORT: NO. 2044A





WHICH DIE STEEL WOULD YOU USE

for hardening accuracy, safety in this critical die section?

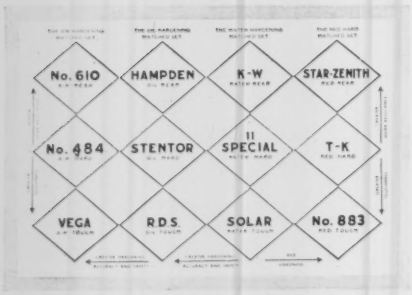
Imagine the problems involved in making and heat treating this critical die section for cutting parts from .014" dead soft beryllium copper.

Numerous cut-outs, sharp corners and thinner sections milled almost through the length of the die present man-size problems in getting the section out of heat treatment safely and accurately.

Which die steel would you be willing to trust on this ticklish job?

Here are the results reported by the diemaker, who chose Carpenter VEGA (Air-Tough) Die Steel for the job: "The section is made from a piece of VEGA 1" x 5" x 12". To hold the stock in line, we had to jig bore and hold a line of ⅛" pilots almost through the entire die length. VEGA permitted us to do this and saved *many hours of work* over a die made from small sections. The first large perforating punch was also made from VEGA. After heat treatment, the punch *entered the die perfectly*. If there was any warpage at all in the punch, we couldn't find it."

This kind of performance is readily available to you by simply calling your nearest Carpenter Mill-Branch Warehouse, Office or Distributor. Large local stocks of Carpenter Matched Tool and Die Steels assure immediate delivery.



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Carpenter STEEL

Matched Tool and Die Steels

The Carpenter Steel Company, 139 W. Bern St., Reading, Pa.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Farval works in Africa, too—lubrication time reduced 93%, grease use cut 83%

FARVAL—
Studies in Centralized Lubrication
No. 202

● Here at a copper mine in Northern Rhodesia, Farval systems were installed on power shovels used to remove overburden. Not only have bearings been protected fully by adequate lubrication, but the time and lubricant savings reported are beyond expectation.

Time required for lubricating shovels has been reduced from two hours per shift to only eight minutes — a 93% reduction. Grease consumption has been cut from 400 pounds per month to only 70 pounds—a saving of 83%.

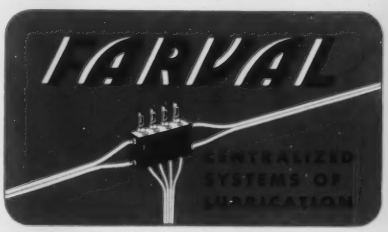
Farval Centralized Lubrication proves its value in scores of mining operations like this—remote from repair shops and supply centers, where economy and dependability pay real dividends.

Find out how Farval can help you. Write for Bulletin 26-S, newly revised presentation of the features and advantages of Farval Centralized Lubrication, complete with engineering data on all types of systems. The Farval Corporation, 3270 E. 80th St., Cleveland 4, O.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing.
In Canada: Peacock Brothers Limited.

KEYS TO ADEQUATE LUBRICATION—
Wherever you see the sign of Farval—familiar valve manifolds, dual lubricant lines and central pumping station—you know a machine is being properly lubricated.

Inset above shows Farval lines and valves mounted on shovel undercarriage.



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MESTA 46" TWO-HIGH REVERSING
SLABBING-BLOOMING MILL WITH
MANIPULATORS AND TABLES

Designed and Built by
MESTA

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA